



FACILITY DESIGN STANDARDS

DRAFT

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**DIVISION OF FACILITIES MANAGEMENT
FACILITY DESIGN STANDARDS**

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SCOPE

This standard is a guide for the design of typical State of Delaware facilities. Compliance is mandatory for Division of Facilities Management (DFM) projects and other projects as requested by the client and subsequently directed by the DFM Project Manager in writing. Deviations from this standard shall be requested in writing by the design professional.

DESIGN CONFLICTS

Notify the DFM Project Manager, in writing, of any and all conflicts associated with the use of this standard and/or requirements that are contrary to current design practice.

UPDATES

This standard will be updated on a regular basis. Use the standard in effect at the time of A/E contract execution.

DIVISION 1 - GENERAL REQUIREMENTS

Section 01000 Codes and Standards

1. The building code adopted by local municipal government (county, city or town) will be complied with unless other stringent design criteria are utilized. If there are any questions, consult with the DFM Project Manager for resolution.
2. All required regulatory approvals (local site plan, State Fire Marshall, DeIDOT, DNREC, etc.) shall be obtained PRIOR TO bid advertisement.
3. Review with the Project Manager what submittals are required for final close out of the project, i.e., archival quality “as-builts,” CADD “as-builts,” CD ROMs, electronic specifications, bound maintenance manuals, etc.

Section 01011 General Design Data

1. The design will be accomplished in compliance with current codes at the onset of the design contract.
2. Live loads are specified by the applicable required building code. Minimum acceptable office floor live load is 60 psf.
3. Confirm all load criteria and any special design program requirements with the DFM Project Manager prior to proceeding with Schematic Design.
4. Isolate elevator equipment room floors and walls for sound attenuation. Locate machinery spaces away from offices, waiting/reception and conference areas. Provide sound attenuation insulation to minimize noise as required.
5. On projects with low-sloped roofing systems, the slope should be incorporated in the structure whenever possible.
6. Floor plans shall show the location, type and extent of all materials, equipment and fixtures. Enlarged detail floor plans of specialized areas (toilet rooms, kitchens, laboratories, shops, mechanical rooms, etc.) shall be drawn.
7. Provide elevations of all walls for toilet rooms noting mounting heights of all accessories and fixtures.

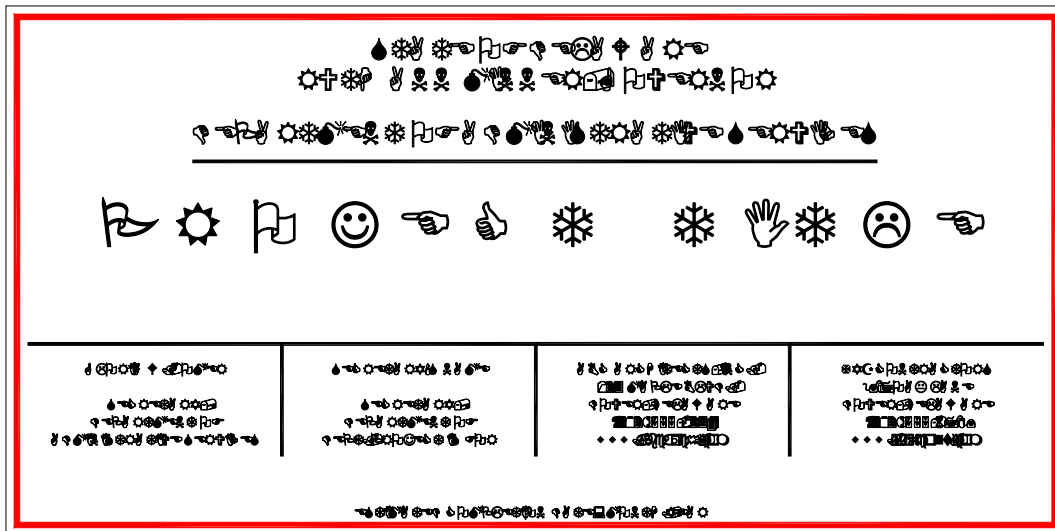
Section 01300 Submittals

1. Design meetings will be held monthly unless the DFM Project Manager and the A/E mutually decide otherwise. Meeting minutes will be taken by the architect at all design meetings. These minutes will be typed and distributed within three to five business days of the meeting date.
2. Conceptual Design (10%) - General site plan layout. Building outline and floor plan. Describe major building materials such as exterior wall finish, structural system, roofing and HVAC systems. Provide written engineering design criteria and design intent. Include HVAC controls sequencing and life cycle cost analysis (LCCA) for mechanical/electrical systems.
3. Schematic Design (40%) - Site plan including utilities. Building floor plans (detailed), building cross sections and elevations. Single line mechanical and electrical systems.
4. Design Development (60%) - Site plan finalized. Building floor plan finalized. Structural system finalized. Mechanical and electrical system components selected. Specifications - review Division 1, table of contents listing of all other sections. Provide one set of floor plans for building occupant for their approval.

5. Final Plan Review (95%) - All plans finalized except for minor details. Specifications complete. A/E to provide two sets for building occupant approval. Allow a minimum of two weeks for building occupant review/approval.
6. Final Plan Signatures (100%) - A/E to provide two sets of plans. Building occupant shall sign one set and return to DFM Project Manager and keep one set for their use during construction.
7. A/E to consult with DFM Project Manager on any special graphics (plans, color elevations or other graphics) required by DFM or the building occupant for use during legislative hearings.
8. Provide summary narrative to DFM Project Manager prior to the preconstruction meeting. Review submittal status at each construction progress meeting.

Section 01500 Temporary Facilities

1. Review requirements for temporary utilities (electric, heat, potable water, toilets, etc.), storage, office space and signage with the DFM Project Manager. Clearly state in the project specifications WHO is responsible for providing these facilities. Include in these section guidelines that the contractor is responsible for the condition and maintenance of all building systems if utilized during construction prior to substantial completion of the work.
2. Areas to be used for stockpiling of materials and equipment to be designated by DFM and clearly indicated on the plans.
3. Building utility shutdowns for existing facilities should be reviewed with building occupant and maintenance personnel prior to bidding. The specific time of day (after regular work hours, weekends) and duration (number of hours) should be indicated in the specifications.
4. As part of the temporary facilities a project sign will be required. The sign is to 8'x 4' and is to adhere to the following graphic for form and content.



Section 01730 Operations and Maintenance Data

1. Provide for three copies of manufacturer's information for all building components, assemblies, subassemblies, attachments and accessories. Information to be included consists of the following: operating instructions, safety precautions, service requirements, preventative maintenance, lubrication data, corrective maintenance, troubleshooting/diagnostic techniques, wiring diagrams and controls and spare parts/supplies.
2. Provide for training and indoctrination of maintenance personnel. Review specific requirements with the Project Manager and facility owner's maintenance personnel. State number of hours required and how many sessions to be provided. Training to be provided during regular business hours unless additional sessions are necessary for evening/night shift personnel. In most cases, the contractor should videotape the training, with the contractor providing all necessary equipment, materials and personnel. An attendance sheet shall be completed by the contractor for all training sessions, with a copy provided to the DFM Project Manager.
3. Operation and maintenance manuals shall be received prior to substantial completion and before training is conducted.

Section 01781 Project Record Documentation

1. As-built drawings shall be maintained by the contractor on a weekly basis. The A/E shall review as-builts at regular progress meetings to ensure compliance by the contractor. As-builts to be submitted for review/approval by the A/E a maximum of 30 days after completion of the project.

DIVISION 2 - SITEWORK

Section 02500 Paving and Surfacing

1. Provide maneuvering room for trucks and service vehicles which require access to the building loading, recycling and dumpster areas.
2. Provide concrete paving for loading docks, fueling stations and dumpster areas.
3. Exterior slabs on grade and paving outside the building enclosure shall be sloped away from the building structure to prevent water build-up at the building perimeter. Specify that all such areas shall be hose-tested prior to acceptance of work to identify slope and drainage problems that may exist. The maximum slope allowed if surface is located in the accessible path (for handicapped) is 1 in 20 (approximately a half-inch per foot).
4. Number of Spaces Required for Project
Parking spaces are required in accordance with the following guidelines with consideration given to requirements of local ordinances. Alert the DFM Project Manager where local ordinances conflict with these standards:
 - a) Building occupants: 1 space per 300 gross sq. ft.
 - b) Visitor spaces: As directed by DFM Project Manager.
 - c) Parking for disabled: In accordance with the current Delaware Architectural Accessibility Board (AAB) standards.
 - d) Special parking requirements: See DFM Project Manager for special project criteria, if any.
5. Parking Layout and Relationship to Building
 - a) The majority of off-street parking should be screened from view from the street as much as possible. The parking layout should be sited in order to be close to the building it serves.
 - b) The parking rows and access aisles should be arranged to be perpendicular to the building whenever possible in order that pedestrians may easily walk toward the building via the access aisles.
 - c) Locate parking at a 90° angle to the access aisle. All access aisles should be open to allow two-way traffic patterns.
 - d) Landscaped islands with curbs shall be located at the ends of all parking rows and throughout the parking lot at an interval that averages no less than one island for every 12 consecutive spaces.
 - e) Islands shall be dimensioned to contain the required amount (cubic feet) of topsoil to sustain growth of plantings.
 - f) Pedestrian access aisles should not cross planted areas.
 - g) Layout parking areas to avoid the dripline of mature trees. When encroachment is unavoidable, install root ventilation systems.
 - h) Spacing of islands should be offset from the islands on adjacent rows to break up the expanse of large parking lots.
 - i) Continuous flow circulation layouts with two-way circulation shall be used.
6. Size and Dimensions (Refer to Appendix B – Parking Standards)
 - a) Unless larger dimensions are required by other considerations, the following minimum dimensions apply: Off-street parking spaces shall be 9 feet wide and 18 feet long. Where the front end of the space abuts a sidewalk, install a wheel stop to prevent vehicles from over-hanging the sidewalk. Install wheel stops (bumpers) 4 feet from the edge of non-hard surfaced areas.

- b) Access aisles along the parking rows are 24 feet wide, and the aisles at the end of the rows are 25 feet wide to allow for vehicle turning movements.
- 7. Materials
 - a) All access aisles and parking spaces shall be hard surface paving materials.
 - b) Curbs and handicapped ramps should be concrete wherever provided.
 - c) Wheel stops (bumpers) shall be gray plastic PVC with three holes for mounting.
- 8. Persons with Disabilities Parking
 - a) Locate parking for persons with disabilities near the public entrance and at the major staff entrance. Parking spaces designated for the disabled shall be those spaces that are nearest to these entrances.
 - b) The handicapped spaces should be adjacent to a curbed sidewalk that is a minimum of 5 feet in width. The use of depressed curbs as ramps is encouraged.
 - c) Install a striped aisle between each two handicapped parking spaces from the parking lot surface to the sidewalk. Drop and ramp the sidewalk down to the level of the accessible parking spaces aisles.
- 9. Visitor and Assigned Parking
 - a) Locate visitor parking spaces near the main entrance of the building and closer to the building than staff parking.
 - b) Confirm with the DFM Project Manager if any parking spaces are to be assigned and how they are to be identified.
- 10. Building Entry Walks/Plazas
 - a) Surfaces shall be slip resistant under wet and dry conditions and slope to drain away from building.
- 11. Sidewalks
 - a) Sidewalks shall be concrete and a minimum of 5 feet wide. Surfaces shall be slip resistant under wet and dry conditions. Slope to drain away from the building.
 - b) Sidewalks/curb cuts that slope to a vehicular right-of-way shall have detectable warnings the full width of the sidewalk or curb cut.
 - c) Layout sidewalks to avoid mature tree roots.
- 12. Jogging/Bicycle Paths (for Campus Plans)
 - a) Jogging/bicycle paths may be located around the perimeter of an office park and through large open space areas.
 - b) These paths should be a minimum of 8 feet wide and constructed of asphalt.

Section 02700 Sewage and Drainage

- 1. Storm drain inlets should be located 25 feet minimum from all major building entrances. Special attention should be given to obtain appropriate ground slopes in order to eliminate the occurrence of temporary ponding during heavy rain and prevent runoff from entering the building. Do not conflict with any stormwater requirements.
- 2. Parking Areas
 - a) Valley gutters shall be used to collect the flow of runoff in the parking lot if uniform sheet flow is determined not to be feasible. If valley gutters are used, they shall be placed along the island curbs at the side of an access aisle and not down the center of the aisle.
 - b) The minimum slope in off-street parking lots without valley gutters is 1%. The maximum slope is 5%. **Cross slopes in the parking area to be used by the disabled shall not exceed 2%.**
- 3. Sidewalks and Plazas

- a) Walks and paths have a minimum cross slope of 1/4 inch per foot, and not to exceed 1/2 inch per foot or accessibility requirements, whichever is less.
 - b) Walks and paths shall be arranged to traverse steep areas at an angle to the contours and with turns back and forth so runoff does not become concentrated in any one direction for long distances.
 - c) Plazas should have a minimum slope of 2% and a uniform surface that prevents ponding.
Special attention shall be given to avoid ponding in the plaza area.
4. General Site Drainage
- a) Ditch and swale side slopes shall not be steeper than 3:1.
 - b) Sod areas, except for retention ponds, should have a minimum slope of 1% and a maximum slope of 3:1.
 - c) Landscaped areas can be used for stormwater conveyance and retention/detention. Swales, retention ponds and other stormwater management facilities may be designed to provide attractive open space in addition to functional stormwater management.
 - d) Use native ground cover plant material for slopes of detention/retention ponds.

Section 02800 Site Improvements

- 1. Review security surveillance during the site design with the DFM Project Manager. Special attention should be given to provide adequate visual control including elimination of potential concealed spaces near public pedestrian areas.
- 2. Plazas, terraces and landscaped areas are not permitted over any occupied building area. This is a mandatory design standard since these features have been a constant source of leaks and maintenance expense to DFM.
- 3. Street and Parking Area Lighting
 - a) A foot candle illumination diagram shall be provided for the parking areas and all major public walkways adjacent to the building.
 - b) See Division 16 for minimum requirements for average maintained illumination.
- 4. Walkways, Building Area and Accent Lighting
 - a) Accent flood lighting of trees and/or architectural features are allowed only at the major building entries.
 - b) All building identification signs shall be lighted.
 - c) Direct burial or well lights are prohibited.
- 5. Style, Materials and Finish. Potential vandalism problems should be reviewed with the DFM Project Manager and if the location requires special protection, polycarbonate lenses or enclosures should be used for lighting fixtures.
- 6. Building Identification and Entry Signs. All design formats shall be reviewed by DFM Grounds personnel as directed by the DFM Project Manager.
 - a) Outdoor dimensional letters shall be cast aluminum, bronze or stainless steel.
 - b) The sign must be clearly legible from a distance of at least 100 feet. Minimum height of the letters shall be 6 inches.
 - c) A building identification sign should be located at or next to the main entrance walk of the building.
- 7. Traffic Signs. Traffic signs are typically the standard signs used by DelDOT. Consult the DelDOT Standard Specifications Manual for guidance.
- 8. Solid Waste

- a) Solid waste is collected in dumpsters located in the building service area. The dumpsters are sized to hold 8 cubic yards unless otherwise directed.
 - b) Space shall be provided for additional dumpsters for recycling purposes. Confirm requirements with the DFM Project Manager.
 - c) All dumpsters shall be located on reinforced concrete slabs with side and rear screening provided. Consult local ordinances for specific requirements.
- 9. Benches
 - a) Bench design should be compatible with the building design.
 - b) Special consideration should be given to minimize future maintenance costs.
 - c) Benches should be freestanding and anchored to be immovable by the public.
- 10. Light Bollards
 - a) Bollards with lights are allowed along entry walkways and plazas at the main entrance (to substitute for other low-level lighting fixtures).
 - b) Bollards without lights may be used elsewhere to separate pedestrian areas from vehicular areas or to protect against vehicle encroachment which may cause damage.
 - c) Light bollards should be either cast or extruded aluminum. The maximum bollard height should not exceed 42 inches.
- 11. Walls and Screen Fences
 - a) Walls or screen fences are placed around all service areas and all large above-grade utility equipment such as central boilers, storage tanks, cooling towers or sewer package treatment facilities. Walls or fences may also be placed along the property perimeter if adjacent to residential or industrial land uses or if required by local ordinances.
 - b) Screen fences or walls should be of a material compatible with the main building.
 - c) The use of cedar for wood fencing is preferred. If the fence is made of fir or pine, the wood shall be specified as pressure treated with a preservative other than creosote.
- 12. Planters
 - a) Planters are defined as planting areas, either raised or on grade, in sidewalks and pedestrian plazas.
 - b) If the planter is to contain shrubs and groundcovers, the planter should have a minimum planting area of at least 10 square feet, with a minimum depth of 18 inches.
 - c) If the planter is to contain a minor tree, the minimum planting area should be no less than 16 square feet, with a minimum depth of 3 feet.
 - d) If the planter is to contain a shade tree, the minimum planting area shall be no less than 64 square feet, with a minimum depth of 4 feet.
 - e) Planters shall not be installed over any building areas that could possibly sustain water damage whether occupied or not.
 - f) Special care shall be given to control efflorescence and moisture deterioration of the planter.
- 13. Bicycle Racks
 - a) Bicycle racks, if required, shall be serpentine style steel pipe and set in concrete.
 - b) Comply with local ordinances for location and number of bike racks required.
- 14. Bus Shelters
 - a) Bus shelters (for Campus Plans) are located along local roads at a few central locations throughout the campus. The shelter locations and design are

coordinated with the local transit authority and compatible with the overall building design.

- b) The shelter shall be anchored to a concrete pad that is built next to the sidewalk so that the sidewalk passes directly in front of the shelter.
15. Trash Receptacles. Will not be specified or installed unless directed by the DFM Project Manager.

Section 02900 Landscaping

1. The designer is encouraged to provide additional shrub and groundcover planting in the area between the parking lot curb and the sidewalk, rather than a single row of shrubs to meet the landscape screen requirement.
2. Preservation of existing landscape and natural vegetation shall be accomplished whenever possible, especially for all trees larger than 6 inches trunk diameter measured at 4 feet above grade. Do not conflict with local ordinances.
3. Have barriers erected around protected trees (extending to the drip line) before construction activity begins. Include in the contract monetary damage amounts to be paid by the contractor for construction damage.
4. A minimum of 8 inches of topsoil shall be obtained in all ground areas. Require the contractor in the specifications to “rototill” subsoil prior to placement of topsoil in all landscaped areas. **If existing topsoil is to be re-used, the A/E shall verify that adequate quantities exist of materials that meet DFM criteria. Provide soil analysis (agricultural, not engineering) to DFM for approval.** Specifications shall require the contractor provide additional topsoil if necessary.

Section 02950 Landscaping Plant Materials

1. Sod will be flush with the finish elevation of the sidewalks and concrete curbs to avoid water from ponding on walks.
2. Mulch, applied at the time of planting, should have a minimum depth of 2 inches. No visible plastic surface covers are permitted.
3. All plant material used in landscaping shall be healthy, disease free and pest free. Only plant material approved by the DFM Project Manager may be used in landscaping.
4. Islands in parking lots shall be fully planted with shrubs and groundcovers. No grass shall be planted in the islands.
5. Specify that topsoil materials are to meet DFM criteria.
6. All plants specified in the planting plan shall be native or adapted to the hardiness zone of the building site and appropriate for the microclimate of their location on the site.
7. No invasive exotic plants shall be used.
8. Drought-tolerant plants should be specified as much as possible.
9. Poisonous plants and plants with sharp thorns or foliage shall not be used.
10. Grass sod should consist of tall fescue blends that meet Delaware planting recommendations.
11. Wildflower mixes should be of low growing varieties, generally under 16 inches in height.
12. **A guarantee period of two full years after acceptance will be established in which the contractor will guarantee free replacement (labor and materials) of any plant material that does not survive.**



13. A routine landscape maintenance schedule will be established setting forth criteria and timing for fertilizing, pruning, etc. as a mandatory submittal in the project close out documents.
14. The contractor is responsible for all landscaping maintenance (including watering) until after acceptance and all required training is received.

DIVISION 3 - CONCRETE

1. Provide epoxy-coated or galvanized rebar supports where supports may be exposed to weathering. Provide flat sheet wire reinforcing mesh in floor slabs and support with chairs. Use chairs that will not puncture the vapor barrier at slabs on grade. Reinforcing steel (including chairs) shall be inspected and approved by the A/E prior to concrete placement.
2. Provide pre-molded expansion joint material where slab is placed around columns and against walls.
3. Contraction or construction joints shall be placed on column lines and at intermediate spacing not to exceed 25 feet.
5. Provide water-stops at below grade construction joints in vertical foundation walls to prevent water penetration.
6. Provide a requirement that a pre-concrete placement meeting be held at least two weeks before any concrete pours of 3 cubic yards or larger.
 - a) Attendants to the meeting shall include the owner, structural engineer, sitework engineer, construction manager, general contractor, concrete contractor, ready mix supplier, placing and finishing contractor, concrete pumping company, testing laboratory, admixture or other specialty product suppliers.
 - b) At the meeting, responsibilities for all aspects of the work will be assigned and agreed upon. A responsibility matrix shall be prepared by the general contractor and published to all parties within three business days.
 - c) Topics to be discussed at the meeting include: responsibilities, mix design review, scheduling and ordering, placement, finishing, testing and curing.
 - d) Consider adding fiber mesh.

DIVISION 4 - MASONRY

1. Cavity wall designs are required. Cavity wall designs based on pressure equalized rain screen walls are preferred.
2. Design weep holes and flashing to evacuate moisture entering the masonry wall. Weeps in brick cavity/veneer construction shall be open head joints. Prefabricated screens may be utilized at weeps to prevent insect infestation. The use of cotton rope wicks or tubes for weeps will not be permitted.
3. Provide a 2 inch minimum width air cavity (exclusive of any cavity insulation). Utilize pull-up boards to prevent the build-up of mortar droppings and bridging in the cavity. There should be no obstructions within the cavity, allowing water to backup and drain into the back-up wall.
4. Detail flashing against parapets under copings, gravel stops, over shelf angles, windows, doors, horizontal relief joints and at changes from horizontal to vertical plane. Submittals should show three-dimensional flashing intersections in isometric detail. Metal flashing materials are preferred.
5. Specify brick masonry with low moisture absorbency.
6. Brick Masonry Accessories
 - a) Specify the type of tie design that will allow for vertical and horizontal differential movement between face brick and backup wall or structure without allowing water to bridge gaps.
 - b) Specify non-corroding hot-dipped galvanized anchors, ties, angles and reinforcement. Design vertical and horizontal expansion joints in masonry wall. Follow BIA recommendations. Drawings should locate these joints on all applicable exterior elevations of project.
7. For multi-story masonry construction, design steel shelf support angles which will allow for building movement and wall deflection.
8. The contractor shall be required to erect a 6-foot long by 4-foot high sample section for approval prior to beginning brick or masonry work.

DIVISION 5 - METALS

1. Protect dissimilar metals against galvanic action.

DIVISION 6 - WOOD AND PLASTICS

1. All wood in direct contact with masonry, concrete or earth shall be pressure treated.



DIVISION 7 - THERMAL AND MOISTURE PROTECTION

Section 07002 Roofing Design Information

1. Preferred roofing systems include the following:
 - a) Metal standing seams
 - b) Four-ply, built-up membrane
 - c) Architectural asphalt shingles
2. Alternative DFM-approved roof systems with a 10-year successful track record include, but are not necessarily limited to the following systems:
 - a) Two-ply adhered, modified bitumen membrane
 - b) Single-ply, fully adhered EPDM membrane (Use of this roofing system is not allowed unless there is no other practical alternative)
3. Mechanical/Plumbing/Maintenance
 - a) Provide for interior access to the roof. Stairs are preferred over ladders.
 - b) Provide walk pads around maintenance items along the route from roof access points to the maintenance items.
 - c) Limit mechanical ventilation and plumbing penetrations through the roof.
 - d) No HVAC units or equipment are permitted on the roof except necessary exhaust fans, vents and outside air intakes. (Exceptions to this requirement must be specifically approved by the DFM Project Manager.)
 - e) Through-the-roof penetrations shall be round pipe or round sleeve. Avoid shapes with corners where possible.
 - f) Maintain a minimum spacing of 4 feet between penetrating pipes and equipment to allow for proper roof detailing work.
4. Drainage Considerations
 - a) Emergency overflow drains are preferred over through-wall scuppers, which are not easy to construct or maintain. Provide a minimum 4-inch high leaf guards on drains.
 - b) Expansion joints shall be elevated upon a solid tapered base; drainage shall be positive and away from the joint at every side. Locate expansion joints at roof pitch high points.
5. Detailing
 - a) Avoid use of uncapped pitch pockets. Limit the use of pitch pockets.
 - b) Provide metal coping cap on parapet tops. Terminate roof membrane under this cap.
 - c) Drawings shall show:
 - 1) All penetrations through the roof
 - 2) All roof ventilators and any other types of equipment to scale
 - 3) Roof walk protection pads
 - 4) Roof drains and overflow drains or scuppers
 - d) Submittals shall detail roof flashing at all types of roof penetrations and show three-dimensional flashing intersections in isometric detail.
6. Quality Assurance
 - a) Roofing materials shall be from a single source manufacturer.
 - b) Non-Prorated Weathertight single source 20-year warranty shall be available. Architectural asphalt shingles shall have a 30-year warranty.
 - c) Review of plans and inspection of application shall be made by DFM's roofing professional services firm.

- d) Provide a requirement that a pre-roofing coordination meeting be held at least two weeks before any roof work. Attendants to the meeting shall include the owner, structural engineer, architect, construction manager, general contractor, roofing contractor, steel or wood framing contractor (roof deck installer), mechanical contractor and owner's roofing professional services firm (inspection). At the meeting, responsibilities for all aspects of the work will be assigned and agreed upon. A responsibility matrix shall be prepared by the general contractor and published to all parties within three business days. Topics to be discussed at the meeting include responsibilities, roof deck inspection, scheduling, debris removal, testing and roofing inspection. If facility is an existing building with occupants, note location of existing air intakes and outline steps to control odors.

Section 07195 Air Barriers

1. Air barriers are made of durable, non-porous materials and are sealed to adjoining wall, ceiling or floor surfaces with suitable long-life mastic. Taped and sealed drywall may constitute an air barrier but dropped acoustical tile ceilings (T-bar ceilings) may not. Batt insulation facings and asphalt-impregnated fiberboard and felt paper are not considered air barriers.
2. Exterior Joints in the Envelope. All exterior joints, cracks and holes in the building envelope shall be caulked, gasketed, weatherstripped or otherwise sealed. Such joints shall include, but not be limited to the following:
 - a) Around windows or door frames
 - b) Between walls and foundations
 - c) Between walls and roof/ceilings
 - d) Through wall panels and top and bottom plates in exterior walls
 - e) At penetrations of utility services or other service entry through walls, floors and roofs
 - f) Between wall and floor where the floor penetrates the wall
 - g) Between wall panels, particularly at corners and changes in orientation
 - h) Around penetrations of flue vents or attic hatches

Section 07200 Insulation

1. Ceiling/roof shall be R-19 minimum.
2. Wall construction shall have the following minimum R values: Concrete R-7, wood frame R-11 and metal frame R-13.

Section 07300 Shingle Roofing Systems

1. Three tab shingles shall be installed using the 6-fastener method.
2. Fasteners shall be wide diameter (7/16 inch) nails. Staples shall not be used. Nails shall be long enough to penetrate 3/4 inch into the roof deck.

Section 07500 Membrane Roofing Systems

1. Roof membrane type shall be proven system with a minimum 10-year successful track record on buildings in the geographic area of intended use.

2. Roofing membrane system selected must meet Factory Mutual (FM) Requirements I-90 for wind uplift or UL class 90.
3. Membrane Roof Warranties
 - a) Roof warranty shall be for a minimum period of 15 years. Twenty years is preferred.
 - b) Warranty shall be non-prorated, non-penal sum type and includes a total system warranty consisting of, but not necessarily limited to, membrane, gravel stop/flashing, connections, insulation and deck, as applicable.
 - c) All warranty conditions for owner-provided maintenance shall be included with the warranty documents prior to final project closeout.
 - d) Specify that a single subcontractor is responsible for the entire roof system.

Section 07600 Flashing

1. Use the latest edition of the “Architectural Sheet Metal Manual” published by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA) as a design guide.
2. Galvanized metal shall not be used for flashing.
3. Verify substrate materials and joint compounds are compatible with flashing and will not cause corrosion of flashing material or staining of face veneers.
4. Flashing details on the drawings to include:
 - a) Roof Flashing
 - 1) Against parapets
 - 2) At all penetrations through roof
 - 3) At gravel stops
 - 4) Expansion joints
 - 5) Corner conditions
 - 6) Non-typical design features
 - b) Wall Flashing
 - 1) Flashing under copings
 - 2) Thru-wall flashing
 - 3) At windows and doors
 - 4) Expansion joints
 - 5) Corner conditions
 - 6) Non-typical design features
5. Design metal flashing and coping caps to eliminate or minimize the use of sealants. Do not rely on sealants as the primary barrier to water penetration.
6. Where sealant joints are required, utilize sealants that are designed to accommodate the movement characteristics and are compatible with the flashing material selected.
7. Protect dissimilar metals against galvanic action.
8. Base flashing should be 8 inches minimum above roof and be a minimum of 4 inches above a 4-inch cant. Metal counterflashing should lap base flashing at least 4 inches.
9. Plan for counter-flashing to be removable and replaceable or renewable.

Section 07900 Sealants and Caulking

1. Specify sealant type to compensate for amount of anticipated joint movement and environmental conditions to be encountered.
2. Specify bond breakers to prevent three-sided adhesion.

3. Specify sealants that are compatible with substrates. Verify that all sealants specified will not bleed onto building exterior skin.
4. Specify sealant primer if required for adhesion to substrate. Consult with sealant manufacturer to verify performance applicability expected.
5. Do not use custom color sealants.
6. If coatings or waterproofing compounds are specified on exterior building skin, verify that they are compatible with sealants and will allow for desired sealant adhesion.
7. Specify that the contractor shall have sealant manufacturers perform adhesion and compatibility tests for each type of sealant, using actual samples of sealant specified and substrate materials and coatings to be adhered to by sealant.
8. Use caulking only for interior joints that do not require waterproofing or movement capabilities.
9. Use acrylic latex caulk conforming with ASTM C 834.
10. Limit caulking joints to 1/4 inch in width or less.
11. All products to be asbestos and lead free.

DIVISION 8 - DOORS AND WINDOWS

Section 08110 Steel Doors and Frames

1. Use welded frames, not knock-down type.

Section 08210 Wood Doors

1. Hollow-core wood doors are not to be used. Nominal width equal to or greater than 1 3/4 inches.

Section 08400 Entrances and Storefronts

1. Storefront to be 4 inches nominal width, center glazed equivalent to Kawneer Tri-Fab 451.
2. Entrance doors to be 4 1/2 inch stile heavy duty aluminum doors, fully glazed with tempered single glazing, piano-type hinges and concealed overhead closers that are adjustable to 8.5 lbs. closing force.
3. Provide power door operators where specified by the DFM Project Manager.

Section 08500 Metal Windows

1. Detail windows (sealing them on the exterior) to prevent air infiltration. Compliance with the criteria of air leakage shall be determined by testing to AAMA/NWWDA 101/I.s.2-97 or ASTM E283-91, as appropriate. Air leakage shall not exceed 0.3 cfm/lin. ft.
2. Provide windows with thermal break construction. Provide units which have been tested for thermal performance in accordance with AAMA 15003.1.
3. Design window sections to accommodate expected wind pressure and turbulence.
4. Components
 - a) Windows shall be fabricated with non-corrosive fasteners.
 - b) Window frames should be designed with baffled weep holes. Do not allow weep holes to be blocked by sealant.
 - c) Air pressure equalizer holes should be provided wherever some portion of a window frame or curtain wall assembly will have a lower pressure than the outside atmosphere.
 - d) Compatibility testing should be specified for all setting materials that come in contact with each other, such as sealants or setting blocks, gaskets and edge shim material.
 - e) Specify that setting block locations will be verified in the field so as not to seal off weep holes.

Section 08550 Wood Windows

1. Wood windows can be used on one-story facilities and for historic renovation projects where approved by the DFM Project Manager.
2. All exterior components shall be factory-finished aluminum or approved vinyl.

Section 08700 Hardware

1. Use passage sets as a default configuration for all doors. Provide grade 2 hardware with lever handles that do not have rough edges or casting imperfections.
2. Provide locking hardware configuration at suite entrances, storage areas, building support spaces (such as telephone and electrical closets, and mechanical rooms) and where specifically required in building program.
3. Use a standard non-mortise lock cutout.
4. All doors opening to outside (e.g., exit doors) shall have non-removable hinge pins. Provide latch guards at exterior doors to deter unauthorized entry protection.
5. All hardware specifications, finishes and schedules shall be submitted to DFM prior to bidding.
6. Locks shall have heavy wrought steel cases and armored fronts adjustable to suit door bevel.
7. Latch bolts shall be anti-friction hinged type with minimum throw of 3/4 inch.
8. Deadbolts shall have a minimum throw of 1 inch. Equip with hardened steel roller inserts.
9. Locksets/latchsets levers on doors leading into hazardous areas shall have a tactile warning finish.
10. Preferred finishes for interior hardware shall be Satin Chromium Plated [626(26D)]; exterior hardware shall be Satin Stainless Steel [630(32D)].
11. Hinges shall be minimum 1-1/2 pair.
12. Cylinders, Keys and Keying
 - a) Cylinders shall be keyed to the DFM key system and are subject to the Great Grand Master, Grand Master, Master and Change Keys. Locksets are to accommodate the DFM standard cylinder (Best Patented).
 - b) Cylinders shall be "Construction Master keyed".
 - c) Permanent cylinders shall be factory keyed as directed by DFM.
 - d) Keys shall be stamped as directed by DFM.

Section 08800 Glazing

1. General Criteria
 - a) Glazing systems should be carefully evaluated in order to accommodate applicable building movement.
 - b) Verify that glass selected can accommodate expected thermal expansion and contractions.
 - c) Glass must meet State of Delaware Energy Code requirements as a part of the exterior building envelope.
 - d) Provide windows with a shade coefficient of 0.32 - 0.45. The ratio of visible light transmittance to the shading coefficient should be equal to or greater than one. Use spectrally selective double pane glazing or tinted single or double pane glazing with a low-emissivity (low "e") rating.
 - e) Provide operable windows where practical.
 - f) Verify that glass meets U-value and shading coefficients required by the mechanical equipment design.
 - g) Window sections to conform to current American Architectural Manufacturers Association (AAMA) standards for commercial or heavy commercial windows.
 - h) Insulated glass must conform to Sealed Insulating Glass Manufacturers Association (SIGMA) guidelines for vertical and sloped glazing.

- i) Washability. Exterior window mullions are not allowed unless approved by the DFM Project Manager for historical reasons. Use removable interior mullions or internal mullions (between double panes).
- j) Standard glass colors for project shall be either bronze or gray, with the final selection to be confirmed by the DFM Project Manager prior to submittal to the Design Development Phase.
- k) Require warranty on insulated units covering seal and build-up of condensation.

Section 08920 Glazed Aluminum Curtain Walls

- 1. General Criteria
 - a) Curtain wall systems should be carefully evaluated in order to accommodate applicable building movement.
 - b) Verify that glass selected can accommodate expected thermal expansion and contractions.
 - c) Glass must meet State of Delaware Energy Code requirements as a part of the exterior building envelope.
 - d) Sealant system to be durable with the ability to be replaced at the end of their design life.
 - e) Wall system to provide for internal water drainage. Do not rely upon sealants as the only barrier to water penetration.

DIVISION 9 - FINISHES

Section 09250 Gypsum Board

1. Gypsum wallboard thickness shall be 5/8 inch minimum when used in single-layer applications.
2. Maximum spacing of partition studs and wall furring: 16 inches o.c.

Section 09300 Tile

1. Ceramic tile should be used in high traffic restrooms.
2. Floors shall be non-slip.
3. Tile wainscots or walls are preferred if the budget will allow.
4. Dark grout is preferred. All grout to be cleaned and sealed by a trained floor care specialist.
5. Thresholds shall be marble with a maximum height of 1/2 inch and edges beveled at 1:2 to meet accessibility requirements.
6. Concrete floors to receive tile shall be free of dust and properly prepared. Adhesive specified shall be selected according to application type and traffic.

Section 09510 Suspended Acoustical Ceilings

1. The standard system is a 2 foot by 2 foot flat, lay-in system with exposed metal grid.
2. Coordinate grid with overall building module. Minimize grid conflicts with major architectural design features.
3. Style, pattern and color of components are selected by DFM from alternatives offered by architect. Select a tile that will be available as a manufacturer's standard material without requiring special ordering or fabrication.
4. Concealed-spline ceilings or fiberglass batt/scrim/vinyl face ceiling tiles are not permitted.
5. Do not use suspended acoustical ceilings in restroom or locker areas; use gypsum board ceilings.

Section 09650 Resilient Flooring and Base

1. Sheet vinyl or vinyl tile floor finishes may be used for support spaces.
2. Studded rubber flooring or 1/8 inch thick floor tiles are encouraged for use in high-traffic areas.
3. Base shall be a minimum of 4 inches, coved at carpeted and resilient floors.
4. Flooring to be non-slip.
5. Seamless flooring to be used in areas such as kitchens and laboratories.
6. Specify that no asbestos floor tile or mastic materials to be used.
7. Specify that the general contractor is responsible for the condition of the flooring surface. Specify that the contractor is to apply two coats of wax by a trained floor care specialist.

Section 09680 Carpeting

1. Provide transition strips for carpet to tile or any dissimilar materials.

2. Use level loop for corridors, public spaces and heavy traffic areas.
 - a) Minimum fiber is 100% 3rd generation, continuous filament nylon with static control, solution dyed and 26 ounce minimum yarn weight.
 - b) Primary backing is polypropylene and secondary is unitary or synthetic with a minimum of 15 lbs. Tuft bind.
3. The DFM Project Manager may decide that carpeting will be provided by a separate contractor using the State carpeting contract. If so, the general contractor is to be required to clean flooring areas of all rubbish and other substances prior to carpet installation.

Section 09900 Paint

1. All interior GWB walls and ceilings to be painted with washable eggshell latex paint (except epoxy in janitor closet).
2. Door frames and trim finishes are semi-gloss enamel.
3. Specify that low-lead and low VOC paints to be used.

DIVISION 10 - SPECIALTIES

Section 10155 Toilet Compartments

1. Use solid polymer plastic partitions or solid phenolic core with solidly fused plastic laminate face sheet partitions. Partitions to be floor supported and overhead braced.
2. The use of enameled metal partitions will be permitted if the budget will not allow solid polymer plastic or solid phenolic core partitions.
3. Plastic laminate partitions shall not be used.

Section 10426 Signage

1. Interior signage to be included as part of the construction documents or as directed by the DFM Project Manager.
2. All signage shall conform to DFM standard signage systems.
3. All signage to meet the Delaware Architectural Accessibility Standards.
4. Exit plans for high traffic areas and large office areas shall be prepared according to Fire Marshal's Standards. Exit plans should be encased in plexiglass and securely mounted.

Section 10800 Toilet and Bath Accessories

1. Toilet accessories include:
 - a) Grab bars with concealed mounting
 - b) Dual-roll toilet tissue dispensers
 - c) Roll paper towel dispenser
 - d) Surface or semi-recessed waste receptacle
 - e) Surface-mounted feminine napkin disposals
 - f) Soap dispensers will be provided by DFM as separate equipment through custodial services (coordinate location in design documents)
2. Toilet accessory finishes are to brushed stainless steel. Finishes shall be coordinated with each other, door hardware and plumbing hardware.
3. Mirrors shall be full width of counter at floating counters or individual over wall-mounted lavatories. Provide warranty against silver spoilage.

DIVISION 11 - EQUIPMENT

Section 11400 Food Service Equipment

1. All equipment shall be durable and applicable to high usage.
2. All finishes shall be brushed aluminum.
3. Three additional copies of the operation and maintenance manuals (three already provided under Section 01730 Operations and Maintenance Data) shall be provided to the kitchen users/operators.

DIVISION 12 – FURNISHINGS

Section 12484 Floor Mats

1. Built-in entrance mat systems are preferred in high traffic facilities. Mats should be modular and small enough for easy removal for cleaning.

Section 12492 Window Treatments

1. Aluminum mini-blinds are the standard treatment for typical facilities.
2. Fabric draperies for special facilities will be coordinated under a separate contract by the DFM Project Manager.

Section 12700 Systems Furniture

1. Systems furniture should be shown on the architectural floor plan during the schematic design phase so adequate space is provided.
2. Electrical and telecommunications services should be planned for early in the design. These services should be located on permanent partitions wherever possible.
3. The systems furniture design and installation will be coordinated under a separate contract by the DFM Project Manager. DFM to coordinate with contractor and A/E to ensure that furniture installation does not interfere with building construction.

DIVISION 13 - SPECIAL CONSTRUCTION

Section 13700 Security Access and Surveillance

1. Certain facilities may require access systems and/or surveillance equipment. These requirements will be authorized by the DFM Project Manager during the programming phase.
2. If required, access equipment will consist of the following: a central computer security management system, software with database access control and password protection, communications system utilizing twisted pair or coaxial cable, control panels, door locking devices, connected to unidirectional proximity card readers.
3. Specify that the contractor shall include programming into database table for the system to provide for access by up to 40 DFM maintenance personnel.

DIVISION 14 - CONVEYING SYSTEMS

Section 14200 Elevators

1. Hydraulic Passenger Elevators
 - a) Minimum capacity of 2500 lbs
 - b) Pre-engineered
 - c) 150 FPM
 - d) Completely accessible emergency hatch
 - e) Doors and frames shall be 36 inches wide center opening with satin stainless steel finish.
 - f) Wall finish shall be plastic laminate with stainless steel handrails on back and both sidewalls. Any upgrades to finishes shall be approved by the DFM Project Manager.
 - g) Floor finish shall be vinyl tile. Any upgrades to finishes shall be approved by the DFM Project Manager.
 - h) Controls shall meet all requirements of the Delaware Architectural Accessibility Standards.
2. Hydraulic Service Elevators
 - a) Minimum capacity of 4000 lbs
 - b) Pre-engineered
 - c) 125 FPM
 - d) Cab height shall be 10 feet
 - e) Doors and frames shall be 48 inches wide center opening with satin stainless steel finish.
 - f) Completely accessible emergency hatch
 - g) Service elevator serves all floors including mechanical or penthouse floors.
 - h) Service elevator is to have a separate direct access to the service area on the ground floor that does not conflict with the general public traffic and elevator access patterns.
3. Elevator equipment room walls shall be acoustically insulated when adjacent to usable (tenant) space.

Section 14420 Wheelchair Lifts

1. Wheelchair lifts are to be only used in renovation projects where there are no other practical means of providing vertical access.
2. On historic renovation projects, the appearance of the lift should be reviewed with the appropriate agency to ensure that it is compatible with the historic character of the building.

DIVISION 15 - MECHANICAL

Section 15010 Specific Design Features

1. Equipment selection, loads and life-cycle cost analyses shall be evaluated at the conceptual stage of the project. Design shall be in accordance with the Delaware Energy Code and all other codes in effect within the project's legal jurisdiction. Proposed architectural features shall be the basis of design. Subsequent architectural changes that affect the thermal performance of the building such as wall insulation, site orientation, changes in area or fenestration, etc. must be reflected in an update to the HVAC load and life-cycle analyses.
2. Cooling and heating loads shall be based upon the actual intended occupancy and internal loads as defined during the schematic design phase. Miscellaneous loads shall be based upon actual number of computers and other heat-producing appliances such as refrigerators, copiers, computers, servers, etc. For office space, the occupant density shall be 200 sq. ft. per person, unless otherwise directed. Consult with the DFM Project Manager and document the design-load parameters on the plans. Do not over design the HVAC system by more than 5%.
3. Provide HVAC design parameters in schedule format on the plans at the design development stage. Specify outdoor design temperatures, indoor temperatures, design humidity level, occupant density and any other pertinent data or assumptions that affect design. The following information should be clearly shown on a Mechanical Drawing:

Mechanical:

Summer Outside	95 F. (F.D.B.) (78) FWB)
Summer Inside	78 F. (F.D.B.) (50% R.H. +/- 10% R.H.)
Winter Outside	0 F. (F.D.B.)
Winter Inside	68 F. (F.D.B.)
Total Cooling Capacity Available	_____ (Tons)
Total Cooling Demand Load	_____ (Tons)
Total Heating Capacity	_____ (BHUH)
Total Heating Max. Demand	_____ (BHUH)
Outside Fresh Air Required:	
Winter	_____ (cfm)
Summer	_____ (cfm)
Domestic Hot Water, Capacity Available	(gph)
Domestic Hot Water Max. Demand Load	(gph)
Steam, Capacity Available	(#/hr.) (If applicable)
Steam, Max. Demand Load	(#/hr.) (If applicable)
Fixtures (Plumbing)	(Fixture units)
Sanitary Sewer	(gpd)
Gas, natural, demand load (max.)	(cph)
Occupants (Density/Types)	

Initial design documentation supportive data, load calculations and a summary of the system proposed shall be provided.

4. Specify Energy Star labeled equipment when available products exist for the intended application.
4. Determine the economic feasibility of incorporating solar energy, thermal ice storage, energy recovery and variable frequency technologies for space heating, cooling and water heating into the building design and proposed energy systems. Economic feasibility for

each function shall be determined by comparing the estimated cost of energy procurement using conventional sources and the estimated cost of using energy saving technologies during the economic life of the proposed building. Assumptions about future energy costs shall be listed. Mechanical system designs shall include all of the following: electric ladder diagrams, control logic diagrams, system schematics, points lists and component descriptions. All mechanical drawings shall be completed on 1/4 inch (or larger) scale drawings. This shall include all rooms with mechanical, plumbing or electrical equipment or piping, including mechanical and electrical rooms, toilet rooms, kitchens, etc.

5. Provide a ventilation schedule on the plans to demonstrate compliance to ASHRAE Standard 62-1999 - Ventilation for Acceptable Indoor Air Quality. A schedule is required for each building/floor and shall include room number, function, number of occupants, ventilation rate, ventilation methodology, subtotals and/or totals and any related notes or assumptions. The ventilation design shall utilize the intermittent or variable occupancy rate or indoor air quality procedures where allowed in accordance with the standard. The design shall minimize outside air (minimum 10%) during unoccupied periods. Utilize CO₂ controls or demand-controlled ventilation approaches where cost effective and/or practical.
7. Provide an air balance schedule on the plans to demonstrate proper building pressurization. The HVAC system shall be designed and controlled to maintain the building and/or each floor at a slight positive pressure.
8. Large conference rooms shall be designed to compensate for the shift in loads in regard to outside air needs during occupied and unoccupied periods.
9. Show all equipment with electric, gas and water service requirements on the drawings. Provide a minimum clearance of 2 feet 6 inches from any obstruction adjacent to the mechanical equipment. Show the requisite space at the end of boilers and chillers to allow rod cleaning and replacement of the internal tubing and at air handlers for removal and replacement of fan shafts, coils, fan wheels, filters, etc.
10. Major air conditioning and/or refrigeration equipment such as chillers, pumps, expansion tanks, etc. shall be located in accessible mechanical rooms preferably located on an exterior wall with exterior access. Major air conditioning equipment shall not be located on the roof unless no other acceptable location exists or can be provided.
11. Ensure that ductwork with insulation is indicated and will penetrate joist webs, roof trusses and other structural members with adequate clearance, as required. Exposed ductwork on the roof or exterior of the building is prohibited.
12. Specify on the plans that HVAC equipment, such as fans, terminal units, etc., installed above the ceiling shall be mounted as low as possible for ease of maintenance. Avoid installing such equipment in or close to critical noise areas such as conference rooms, sleeping rooms, etc.
13. Air conditioning for communication closets or main telephone switch rooms shall be designed to operate in accordance with the equipment manufacturer's temperature/humidity requirements.
14. Provide an alarm system for chillers and boilers to communicate a "failure condition" to the Delaware State Police Communications Center. Utilize a phone modem separate from other building life safety alarms (fire alarm).

Section 15245 Vibration Isolation

1. Pumps, fans and other equipment shall have maximum vibration levels specified.

2. Specify spring-isolated inertia bases for pumps located in off-grade mechanical rooms and direct-mount pump bases on housekeeping pads when located at grade level.

Section 15250 Mechanical Insulation

1. All chilled and hot water piping through walls, floors and roofs shall be in sleeves, continuously insulated and fire proofed as required.
2. Specify only exterior insulated ductwork.

Section 15300 Fire Protection System

1. Fire sprinkler systems shall be designed and installed in accordance with NFPA 13, NFPA 13A and NFPA 14.
2. Specify locating sprinkler heads away from switchgear, cable racks, UPS, etc.
3. Utilize pendant sprinkler heads for all occupied areas unless directed otherwise.

Section 15400 Basic Plumbing Requirements

1. Communication rooms: No domestic water or sanitary piping shall pass through these rooms.
2. Specify floor drains with trap primers in all plumbing chases.
3. Domestic cold and hot water mains and risers and horizontal roof drainage piping shall be insulated.
4. Specify that all piping shall be properly labeled, using preprinted labels at intervals not to exceed 10 feet. Labels shall be color coded according to pipe contents with directional arrows to indicate pipe flow.
5. Plumbing riser diagrams shall be shown for clarification when necessary, especially on multi-story buildings. Provide valves to isolate each floor, each fixture, etc. from the rest of the piping system(s).

Section 15410 Plumbing Piping and Specialties

1. Domestic water piping shall be copper in accordance with the applicable ASTM standards for below-grade (type K) and above-grade (type L) use.
2. Roof drainage piping material shall be the same as piping material for sanitary waste and vent.

Section 15420 Drainage and Vent Systems

1. Specify cleanouts as required by code. Keep cleanouts away from emergency egresses, entry walks, doorways and out of public and tenant use areas.
2. Sanitary waste and vent piping may use PVC, schedule 40 or no-hub or bell and spigot standard weight cast iron for above and below grade.

Section 15440 Plumbing Fixtures

1. Lavatories shall be vitreous china or integral solid surface (corian) or under-mount bowls (preferred) in solid surface counters. A backsplash is required in toilet lavatories (4 inch minimum height).
2. Water closets shall be wall-hung, white vitreous china, elongated, lever handle flush valve, with open front seat and suitable carriers/chairs.
3. Urinals shall be wall-hung, white vitreous china, elongated bowls, lever-handle flush valve, with suitable wall hangers, high-back design.
4. Service sinks shall be floor-mounted, either molded stone or terrazzo.
5. Specify washerless faucets.
6. Water heaters shall be high efficiency storage type, with glass-lined tank of minimal capacity required for its application.
7. Hose bibbs shall be chrome plated with a 3/4 inch hose connection, frost free, vacuum breaker and key-handle operator. Specify exterior hose bibbs with vacuum breakers located on each side of the building spaced no farther than 150 feet apart.
8. P-trap and supply lines on accessible lavatories must be insulated or offset.

Section 15510 Mechanical Piping and Specialties

1. Gas lines shall be of all welded black steel construction inside of the building, connected to emergency shut-off valves. All gas piping and valves are to be clearly labeled. Gas lines from valve to appliances may have screw-type fittings for 3/4 inch and smaller.
2. Chilled water and heating water valves in underground systems shall have as an enclosure a concrete valve box with sufficient space to maintain and operate valves.
3. Piping shall not be:
 - a) Buried beneath the lowest floor level except for soil pipe.
 - b) Run in concrete floors.

If pressure piping placement under slab is unavoidable, then the piping must be run in a steel pipe sleeve so leakage can be channeled off.
4. Direct burial of steam piping is not acceptable. Concrete or metal duct shall be provided.
5. Early in the design phase, verify the location of main mechanical/electrical service entry equipment rooms in order to minimize utility extensions and to perform an adequacy evaluation concerning a particular utility or utilities.
6. Valves
 - a) All control valves shall be listed in a schedule on the drawing showing identification number, body size, port size, if applicable, whether normally open or closed, spring range and CV.
 - b) All service valves 4 inches or greater shall be OSY gate.
 - c) All valves installed at heights greater than 6 feet shall have chain activators provided.
 - d) Butterfly valves shall be used for automatic isolation, temperature control and automation functions. Use Globe, Angle and "Y" valves for throttling services.
 - e) All valves in copper piping systems 2 1/2 inches or smaller shall be ball, single piece type unless otherwise noted.
 - f) Provide flexible copper tubing with removable key cut-off valves at all lavatories and sinks.
7. Provide for water treatment of all boiler make-up water and chilled/hot water piping. Coordinate with DFM maintenance staff and water treatment contractor.

A. HVAC Pumps

1. Pumps shall be capable of being serviced without disturbing piping connections or motors.
2. Pump motors shall not exceed 1750 RPM.
3. Impellers shall be selected to be no more than 5% below the point of maximum efficiency. Impellers shall be selected at no more than 85% of volute diameter.
4. Pump motor horsepower shall be selected with a service factor of no less than 15% greater than the motor rating.
5. Vibration isolation shall be provided for each pump.
6. Hot water pumps shall utilize seals capable of operating at 250 F°.

B. Automatic Temperature Control

1. Provide a stand-alone direct control system for space conditioning controls in DFM-managed buildings with remote monitoring and control by DFM at the regional maintenance office (Wilmington, Dover or Georgetown). At remote locations, building controls shall include a means for night, weekend and holiday set-back, minimum.
2. All air conditioning chilled coils shall be provided with three-way control valves and variable speed pumping via controlled frequency drive technologies.
3. Under-floor crawl spaces shall be ventilated, utilizing stand alone building exhaust air (used conditioned air supply) specifically for this purpose.
4. Fire dampers shall be installed in accordance with the State's building and fire codes.
5. Smoke detectors shall be installed in air handling units in accordance with the National Fire Codes.
6. Duct sizes shown on plans shall be clear inside dimensions. Ductwork shall be externally lined. Sound attenuation devices should be used to reduce air flow noises. Ductwork shall be sized to provide for low pressure to medium pressure design applications only. The use of air conditioned air is preferred with equaled positive exhaust air system.
7. Floor plans for mechanical systems shall be drawn with room names and numbers to show pipes, ducts, etc. on the floor in which they are installed.
8. All equipment shall be designed and located for ease of maintenance.
9. The specifications shall include the requirement that the contractor shall engage and pay an independent contractor certified by NEBB or AABC to perform the balancing, testing and adjusting of HVAC systems, fume hoods, exhaust hoods, clean rooms, etc. NEBB or AABC procedural standards shall be utilized.
10. Compliance with ASHRAE 62-89 standard "ventilation for acceptable indoor air quality" is required.
11. Constant volume reheat for office applications shall be avoided.

C. Building Systems Equipment Accessibility

1. Equipment located above a finished ceiling shall have adequate ceiling access for maintenance and removal, including removal of coils.

2. All electrical distribution equipment shall have access as specified in the latest edition of the NEC for the front and all sides having access panels.

D. Flow Diagrams

1. The diagrams shall be included in the Construction Drawing documents and shall include fluid type/directions, all line sizes, in-line devices (valves, strainers, control valves, thermometers, pressure gauges, flow measuring devices) and flow quantities for headers and branch lines and pump(s).

E. HVAC

1. Types of air conditioning systems shall be as determined to be the most economical energy saving system for the particular application.
2. Chiller plants at capacities less than 100 air conditioning tons shall be of the reciprocating package design. Applications greater than 100 tons shall be of the centrifugal chiller application.
 - a) Environmental capatibility with regards to ozone depletion and global warming potentials.
 - b) Chiller plant control panels shall be microprocessor based in their control strategy.
 - c) Mechanical room ventilation in accordance with ASHRAE 15-94.
 - d) Refrigerant monitoring as specified in ASHRAE 15-94.
 - e) Panels shall annunciate system temperatures in Fahrenheit and parameters in English units with equivalent metric units.
 - f) Start-up/shut-down sequences shall be performed through chiller control panels. Integration of valve openings/closings, pump starts/stops, cooling tower fan starts/stops shall be implemented through said chiller control panel(s).
 - g) Where feasible, “free cooling and/or ice storage” concepts shall be utilized.
3. Where practical, applications shall utilize modulating three-way control valves. In such applications, electronic variable speed drives shall supply the cooling/heating medium to the coils. The variable drives shall operate to maintain system working pressure.
4. Facility HVAC designs shall employ four-pipe cooling and heating systems.
5. Air side distribution designs shall be based upon a life cycle analysis. Air side distribution designs shall review various applications with long term studies determining the most energy conservative design for each application. It should be noted, however, that operational and maintenance integrity should also be reviewed in the selection of the design.
6. Air side designs preferred are variable air volume or constant volume single-duct systems. Over-cooling conditions shall be overcome with supplemental electric or hot water individual zone heating.
7. Applications that employ variable volume delivery shall utilize electronic variable speed control on fan drives to maintain duct static pressure, where applicable.
8. Air moving equipment shall be selected to operate in the low-static to medium-static pressure applications. High pressure applications shall not be used.

9. Steam shall not be used for direct heating of air except in 100% outside air heating units.

F. Mechanical Equipment Room Requirements

1. Mechanical rooms shall be designed with maintenance requirements in mind. Equipment must be fully accessible to allow for proper servicing including adequate space to disassemble all pumps, motors and chillers. Provide access for all required trap primers.
2. Mechanical rooms should be located at grade level. Should a mechanical room be located below grade, a vehicular ramp and a 6 foot 0 inch clear width (two, 3 foot wide doors) shall be provided to facilitate equipment replacement. Roof-mounted equipment is to be avoided. If, however, roof-mounted equipment is specified, provide exterior roof walkways to allow servicing of equipment accessible through standard doorways with permanent stairs or built-in ladders.
3. Air conditioning condensate lines should connect to roof drains when possible. Dumping of water on roofs is to be avoided.
4. Provide at least one floor drain for every 144 sq. ft. in each equipment room. Locate drains away from walking areas, but not beneath equipment. Slope floor to drain, and connect drain to sanitary sewer system.
5. Provide adequate clearance and access for building systems installed between ceiling and structure above.
6. Provide positive ventilation and exhaust in all equipment rooms that are with hot return air plenums, in accordance with most recent edition of ASHRAE Mechanical Room Ventilation Guidelines.
7. Equipment rooms with equipment other than those items directly related to air handling equipment will not be used for air plenums. The use of rooms as plenums is not acceptable.
8. Each component of an air handling system shall be spaced so there is ample room on all sides for inspection and maintenance (filter removal, bearing replacement, coil replacement, cleaning, etc.) and man-sized hinged access doors shall be provided for ready access to spaces in the air handling equipment.
9. Suspended air handlers shall be provided with permanent platforms for maintenance including appropriate access to platforms where required.
10. Walls of equipment rooms, when located on occupied floors, shall be sound proof and return air passages shall utilize sound attenuation boxes.

Section 15711 Cooling Towers

1. Multiple cell towers and isolated basins are required to facilitate operations, maintenance and redundancy. The number of cells shall match the number of chillers. Supply piping shall be connected to a manifold to allow for any combination of equipment use. Cooling towers shall have ladders and platforms for ease of inspections and replacement of components.
2. Induced draft cooling towers with multiple-speed or variable-speed condenser fan controls shall be considered baseline. Induced draft towers shall have a clear distance equal to the height of the tower on the air intake side(s) to keep the air velocity low. Consideration shall be given to piping arrangement and strainer or filter placement such

- that accumulated solids are readily removed from the system. Clean-outs for sediment removal and flushing from basin and piping shall be provided.
3. The cooling tower's foundation, structural elements and connections shall be designed for a 44 m/s (100 MPH) wind design load. Cooling towers shall be constructed of corrosion-resistant materials (stainless steel, fiberglass and PVC) particularly in coastal areas, and for tower components that are typically wet in the normal operation of the tower. If the cooling tower is located on the building structure, vibration and sound isolation must be provided. Cooling towers shall be elevated to maintain a 3 foot minimum clear space beneath the bottom of the lowest structural member, piping or sump, to allow reroofing beneath the tower.
 4. To improve systems efficiency, the sequence of operations controlling the cooling tower leaving water temperature should be designed to provide the coldest condenser water that the chillers are designed to handle. Special consideration should be given to de-icing cooling towers' fill if they are to operate in sub-freezing weather, such as chilled water systems designed with a water-side economizer. A manual shutdown for the fan shall be provided. If cooling towers operate intermittently during sub-freezing weather, provisions shall be made for draining all piping during periods of shutdown. For this purpose, indoor drain down basins are preferred to heated wet basins at the cooling tower.

Section 15855 Air Handling Units

1. Fans shall be sized and specified to provide low noise and vibration levels.
2. Shall not be located on the roof, unless absolutely necessary.
3. Specify equipment that uses standard size filters in rack assemblies. Specify that equipment shall provide design flowrates (CFM) with 50% filter loading.

Section 15860 Fans

1. Fans shall be sized and specified to provide low noise and vibration levels.

Section 15890 Ductwork

1. Ducts shall be constructed of G-90 galvanized steel sheet.
2. Specify sealing all seams.
3. Duct-pressure testing, with owner and representative witnessing results, should be done prior to installing insulation.
4. Specify only exterior insulated ductwork.

Section 15975 Energy Management and Control Systems

1. Unless directed otherwise in writing, specify and design a Direct Digital Control (DDC) Energy Management and Control System (EMCS) for the HVAC system, security, lighting and fire alarm systems. The controls' drawings and specifications are the responsibility of the engineer. The engineer shall coordinate the design with the controls' contractor.
2. Unless specified otherwise, the EMCS shall be fully integrated and include a personal computer operator interface. In all installations, the EMCS shall incorporate stand-alone module system architecture and not be dependent on the central processing unit (CPU) for routine operations. The CPU communicates with the stand-alone modules via

- Ethernet phone lines and a modem or other method and provides supervisory control of modules. Provide CPU local to each building.
3. The CPU, laptop and related peripheral equipment shall be equal to the industry standard available at the time the controls' contract is executed and be adequate to operate the system in accordance with the design intent.
 4. Locate the EMCS in the DFM Maintenance Office. This office shall be separated by walled partitions and be temperature controlled.
 5. Provide run status for all chillers, air handlers, pumps and condensing units.

DIVISION 16 - ELECTRICAL

Section 16025 Quality Control Items

1. Every duplex receptacle shall be tested for polarity grounding and GFI protection.
2. Provide an electrical system testing specification describing: tests to be performed, acceptance criteria, timely notice to the owner to witness tests and furnishing test results to owner.
3. Provide maintenance schedules incorporating manufacturer's recommendations.
4. Emergency power shall be limited to those devices essential to the operation of the building under conditions of emergency egress. Contact the DFM Project Manager for any other emergency power requirements.
5. Circuit breakers in the emergency power system and optional standby system are coordinated so that a fault on the optional standby system will trip the correct circuit breaker and leave emergency power on and functioning.
6. Provide comprehensive on-site and factory training on electrical equipment operation and safety concerns for personnel who will operate the buildings.

Section 16050 Basic Requirements

1. Provide complete, safe, efficient, cost effective, operational systems for lighting, power, security, fire safety and communications.
2. Clean power systems for computers are only provided in computer rooms. Convenience outlets for offices, which may be used for desktop computers, are limited to four receptacles per circuit.

Section 16110 Conduit and Raceway

1. Underground high voltage circuits shall be installed in concrete encased PVC conduit, 4 inch diameter or greater. The top of the concrete envelope shall be more than 24 inches below grade. Rigid conduit, without concrete, is also acceptable.
2. Minimum trade size for conduit shall be 3/4 inch.
3. Conduits within the building enclosure shall not be PVC.
4. Flexible conduit and liquid-tight in wet locations may be used for connections to light fixtures and equipment with noise, vibration or motion problems.
5. Cable tray or J hooks shall be provided for telecommunications systems with entries into communications rooms spaced to prevent crowding. Details on the plans are to clearly depict the method of installation and a coordinated path for the tray to follow. Good engineering practice would indicate that these cables can rise or drop without difficulty or without bends and special fittings.

Section 16120 Wires and Cables

1. All internal building wiring conductors shall be copper conductors. Conductors shall be No. 12 AWG or larger. Use of MC cable is not permitted. The only exception will be the drop from a junction box to a light fixture. Conductors 500 MCM or less in size shall be copper.

Section 16126 Communications Cable

1. The DFM Project Manager, with the assistance of Department of Technology and Information (DTI), will establish the design criteria for communications cables.

Section 16130 Boxes and Fittings

1. Any boxes located outside the building envelope shall be NEMA 3R.

Section 16140 Wiring Devices

1. Receptacles shall be commercial grade, NEMA 5-20R, side wired, grounding type.
2. Switches shall be specification grade 125/277 volt, 20 ampere, poles as required.
3. Cover plates shall be standard size plastic or metal with smooth finish.
4. Color for switches, receptacles and cover plates shall be selected by the owner. Utilize red-colored receptacles for emergency power circuits.
5. Special-purpose receptacles shall be provided to suit equipment requirements.

Section 16160 Enclosures and Cabinets

1. Locate only in readily accessible areas with the required working space per NEC.

Section 16180 Electric Motors

1. Specify high-efficiency type electric motors.
2. Specify that the warranty period for motors is to be five years minimum.

Section 16190 Electrical Supporting Devices

1. Conduits, cable trays, boxes and fittings are hung from the building structure with metal supports. No electrical item shall be hung from pipes or ductwork.

Section 16195 Electrical Identification

1. Electric panel identifiers include the number of the room in which they are located.
2. Electrical panels shall have an engraved laminated plastic label attached with glue and screws to the outside cover.
3. Embossed plastic tape labels are not to be used.
4. Panels shall have typewritten directories.

Section 16200 Power Generation

1. Emergency generators should be provided for specific facilities as authorized by the DFM Project Manager.

Section 16300 Voltage Distribution Equipment

1. Provide landscaping to shield out-of-doors equipment installations from view.

Section 16320 Transformers

1. Specify transformers used to supply clean power systems to be K-rated transformers. It is not the desire of DFM to own primary electrical distribution equipment; coordinate with local utility.

Section 16390 Grounding

1. All branch circuits shall have a grounding conductor installed with that circuit.

Section 16420 Service Entrance Equipment

1. Spare fuses mounted in a wall cabinet shall be provided for fusible devices.

Section 16440 Disconnect Switches

1. Safety switches are heavy duty, quick-make, quick-break, horsepower rated in an appropriate NEMA enclosure.

Section 16470 Panelboards

1. Panelboards are dead front with bolt-on thermal magnetic circuit breakers with copper buses.
2. All panelboards on one project are the product of one manufacturer. When adding to an existing facility, new panels should match the existing if possible.
3. Provide 25% spares in panelboards.

Section 16500 Interior Lighting

1. Lighting loads shall not exceed 1.5 watts per square foot in any room. Exceptions are for rooms with ceiling heights above 12 feet and other special applications as approved by the owner.
2. Occupancy sensors, photocells or other energy conservation devices are recommended.
3. Interior lighting levels are the lesser of the average maintained levels listed in the IES Handbook or the levels listed below:
 - a) General office space 50 foot-candles
 - b) Conference rooms 30 foot-candles
 - c) Corridors 5 foot-candles
 - d) Toilet rooms 20 foot-candles
 - e) Storage rooms 20 foot-candles
4. General office space shall be lighted via standard 2 foot by 4 foot, two or four lamp fluorescent lighting fixtures. Indirect lighting is used for computer screens, training rooms, conference rooms and offices for visual comfort.
5. Ballasts are electronic.
6. Semi-specular louvers and reflectors have finger print and dust resistant finish.
7. Use of 2 foot by 2 foot fluorescent fixtures must be approved by the Project Manager.

Section 16501 Lamps

1. Energy efficient lamps shall be installed where economically feasible.
2. Incandescent lamps, including tungsten halogen lamps, shall only be installed for seldom-visited areas like elevator pits and attics.
3. Fluorescent lamps of one size shall be the same color. The preferred lamp is T8 32 watt.
4. Lamps shall be environmentally-safe (alto) type.

Section 16522 Roadway and Parking Area Lighting

1. Selection of light poles style, color and luminaries shall be coordinated with the architect.
2. A foot-candle illumination plan will be provided for the parking areas and all major public walkways adjacent to the building.
3. The maximum variation of exterior lighting from maximum to minimum is 10 to 1 (10:1).
4. The minimum exterior light levels are:
 - a) Building entrances 4.0 foot-candles
 - b) Arterial roads 1.2 foot-candles
 - c) Local roads 1.0 foot-candles
 - d) Parking areas 1.0 foot-candles
 - e) Sidewalks 1.0 foot-candles
5. All site lighting and signage shall be controlled by a photocell or timer located within the buildings or by the Building Management System.
6. Entry doors shall be illuminated.
7. Use of bollards with lights or other low-level lighting fixtures require approval by the Project Manager.
8. Height of luminaires above grade level shall not exceed 40 feet.

Section 16535 Emergency Lighting

1. Exit lights shall have white polycarbonate, easy snap housing with 6 inch stroke red letters and LED lamps, Energy Star-labeled, with a 25-year warranty.
2. Exit lighting shall be on a separate dedicated circuit from other building lighting.

Section 16590 Hazardous Location Fixtures

1. Vandal-resistance light fixtures shall be supplied if required by the Project Manager.

Section 16670 Lightning Protection

1. Only UL listed lightning protection systems complying with NFPA 780, Lightning Protection Code, may be installed.
2. Provide a Class B UL master label lightning protection system using copper air terminals and conductors.
3. Flagpoles shall be aluminum and shall be grounded.

Section 16720 Building Security Equipment

1. Provide a complete combination manual and automatic, zoned, supervised, addressable fire alarm system capable of interfacing with the Delaware State Police Communications Center.

Section 16721 Fire Alarm Equipment

1. Only addressable fire alarm systems to be used.
2. All devices shall be properly labeled and identified.
3. System shall communicate alarms to the Delaware State Police Communications located at the Delaware Emergency Management Agency (DEMA) facility located in Smyrna, Delaware.
4. All wiring must be located in cable trays or supported by bridle rings or other approved hangers/supports.

Section 16740 Voice and Data Systems

1. Specify that the contractor shall provide all necessary rough-in for later installation, by owner, of voice and data wiring and equipment. Contractor to provide empty box at all locations as shown on the drawings. Conduit, with pull string inserted, shall be installed from boxes and stubbed above the ceiling.
2. All wiring closets, either main distribution frame or intermediate distribution frame, shall be constructed with 3/4 plywood painted walls. Closets shall contain at least two duplex outlets (separate circuit emergency power if available) and shall be temperature controlled (heated and cooled). Specify that the contractor shall complete all coring through concrete floors, ceilings and walls to provide an unimpeded route from where the communications cable enters the building to these closets.
3. Provide a distribution system for transport of data and voice telephone signals throughout the building from designated demarcation points to outlets located at various desks, workstations and other locations.
4. Each office location shall contain the following systems outlets:
 - a) Two data ports and two communications ports all mounted in an extra-deep two-gang box.
 - b) Two duplex 20-ampere outlets mounted in a double-gang box. This outlet to be located directly adjacent to the data/communications outlets.
 - c) Two additional duplex outlets mounted on other walls in the same room.
 - d) Care must be exercised to coordinate locations with layouts for best outlet locations in each area.

Section 16745 Telecommunications Wiring Components

1. The DFM Project Manager, with the assistance of Department of Technology and Information (DTI), will establish the design criteria for communications cables and equipment.

DIVISION 17 - BUILDING COMMISSIONING

Section 17100 Commissioning

1. Commissioning – A systematic process of ensuring that all building systems perform interactively according to the design intent and the owner’s operational needs – shall be incorporated where:
 - a) New construction over 50,000 s.f.
 - b) Renovated/replaced equipment/systems in buildings over 50,000 s.f.
 - c) As requested by DFM Project Manager.
2. The commissioning process does not reduce the responsibility of the system designers or installing contractors to provide a finished and fully functional product.
3. Commissioning of large or technically complicated projects shall begin at the pre-programming stage and last until the building has been occupied for four full seasons.
4. For large or technically complicated projects, a formal commissioning team shall be established and consist of the following:
 - a) Commissioning authority
 - b) DFM Project Manager
 - c) DFM maintenance representative
 - d) Representative of CM and/or GC
 - e) Representative of A/E
 - f) Mechanical contractor
 - g) Electrical contractor
 - h) TAB representative
 - i) Controls contractor
 - j) Others as required
5. Ideally, the commissioning authority shall be an independent authority, not otherwise associated with the A/E team or the contractor.
6. Responsibilities
 - a) The primary role of the commissioning authority is to develop and coordinate the execution of a testing plan, observe and document performance and determine whether systems function according to documented design intent and the contract documents.
 - b) If the owner is represented by a construction manager (CM), the CM shall ensure that commissioning activities are scheduled into the master schedule and facilitate coordination, ensure proper distribution of documents, submittals, changes, etc. and coordinate resolution of non-compliance.
 - c) The general contractor and relevant subcontractors shall attend all commissioning meetings, execute their commissioning responsibilities according to the contract documents and schedule, prepare O&M manuals and train owner personnel.
 - d) The A/E shall be responsible for preparing a Design Intent Document in the design development stage. This document will describe the “design intent” of the building and each major system. For small projects, the Design Intent Document may not be required at the discretion of the DFM Project Manager. Suggested items in this document are:
 - 1) General Description:

- Project goals (major users, functions, consolidation, expansion, significant design constraints, etc.)
- 2) Site Overview
 - Underground utilities
 - Storm drainage
 - Field observations
- 3) Structural/Architectural Overview
 - Summary of structural system key items
 - Loading limitations
 - Roofing
 - Special systems
 - Field observations
- 4) Plumbing Overview
 - Domestic water
 - Booster systems
 - Sanitary/Vent
 - Storm
 - Laboratory Gasses
 - Vacuum
 - Chemical Treatment
 - RO/DI water systems
 - Field observations
- 5) HVAC Overview
 - Ventilation
 - Refrigeration
 - Exhaust
 - Air Handling
 - Heating
 - Energy Recovery
 - Controls
 - Special systems
 - Chemical treatment
 - BAS system
 - Field observations
- 6) Fire/Life Safety Overview
 - Sprinklers
 - Fire pump
 - Smoke evacuation
 - Fan system interlocks
 - Alarm system
 - Field observations
- 7) Electrical Overview
 - Power distribution
 - Lighting
 - Communications
 - Emergency power
 - Clock systems
 - Field observations
- 8) Appendix

- HVAC zone plans
- HVAC systems one line diagrams
- Actual vs. measured capacities of HVAC equipment
- Plumbing/piping/gas/fire riser diagrams
- Power distribution one line and riser diagrams
- Fire alarm and communications riser diagrams
- Fire alarm device location plans (w/device ID or zone number)
- Major electrical equipment location plans
- Actual vs. plan room names (if different)

NOTE: Overviews should include a brief description of the system in question and key design criteria including:

- Owner and code requirements
- Assumptions
- Physical or other constraints
- Plans for future
- Indoor/outdoor design temperatures, humidities
- Indoor/outdoor design noise levels
- Expected equipment heat/power densities
- Air quality
- Lighting foot-candle levels
- A layman's description of expected function in each season or mode of operation. This description should include a specific section for the function of all safety controls.
- Figures that are 11 inch by 17 inch maximum

Design Intent Document shall be submitted at the end of the design development stage. An updated copy of the Design Intent Document with changes noted shall be submitted at the completion of construction document preparation stage.

- e) During the warranty period, all parties shall return to participate in required seasonal or deferred testing, deficiency corrections and 11-month walkthroughs with facility staff.
7. The project specifications shall be adapted to incorporate the commissioning process so that all bidders are aware of their responsibilities during the construction. The specifications shall generally follow ASHRAE guidelines, latest edition, "The HVAC Commissioning Process". The following specification sections should be amended to include the commissioning process:

0800 Supplementary Conditions	Provides for a penalty if commissioning is not completed by the Functional Completion milestone.
01040 Coordination	Introduces commissioning and refers to Division 17.
01300 Submittals	Alerts all parties that additional detail in submittals may be required and directs to Division 17.

01700 Project Close-out	Defines Substantial Completion and Functional Completion milestones, relative to commissioning.
01730 O&M Data	Alerts all parties that O&M documentation may be more detailed and directs to Division 17.
15010 Mechanical General	Alerts the mechanical contractor to Cx responsibilities in 15995.
15950 Automatic Controls	Lists special requirements and alerts the controls contractor of the special requirements of the control contractor and control system in 15995.
15990 TAB	Alerts the TAB of Cx responsibilities in 15995.
15995 Mechanical Cx	Describes the Cx responsibilities of the mechanical, controls and TAB contractors and the prefunctional testing and start-up responsibilities of each. Points to 15997 for functional testing requirements.
15997 Mechanical Testing Requirements	Describes the specific functional testing requirements Division 15 equipment in the project.
15998 Mechanical Prefunctional Checklists	Provides the prefunctional checklists for use on this project, including items for Division 15 and Division 16.
15999 Mechanical Functional Tests – Examples	Provides example functional test procedures and formats for mechanical equipment.
16010 Electrical General	Alerts the electrical contractor of Cx responsibilities in 16995.
16995 Electrical Cx	Describes the Cx responsibilities of the electrical contractor.
16997 Electrical Testing Requirements	Describes the specific functional testing requirements for Division 16 equipment in the project.
16998 Electrical	Points to Section 15998 prefunctional checklists.

16999 Electrical Functional
Tests – Examples

Provides example functional test procedures and formats for electrical equipment.

17100 Commissioning

Describes the commissioning process, responsibilities common to all parties, responsibilities of the A/E, CA, CM, PM, GC and Suppliers, focusing on the CA. The unique mechanical contractor, controls contractor, TAB and electrical contractor responsibilities are included in Divisions 15 and 16.

8. Additional specification sections will need adapting as other building components are added to the commissioning process, for example vapor barrier and roofing systems. Confirm scope of commissioning with DFM Project Manager.
9. The commissioning authority shall prepare a construction phase commissioning plan including a detailed explanation of required tests, prefunctional checklist and tests, functional tests and verification procedures. Scheduling for execution of functional testing procedures, procedures for O & M manuals approvals, warranties and training and orientation of owner personnel.
10. All standard testing equipment necessary to perform required functional tests shall be provided by the contractor unless stated otherwise in the specifications.
11. The commissioning authority shall schedule and conduct required commissioning meetings and provide regular reports to the owner. The first meeting with the contractor(s) should be prior to the start of construction.
12. The commissioning authority shall witness and document the performance of all functional performance tests.
13. The costs for a contractor or subcontractor to repeat a prefunctional or functional test shall be theirs if they are responsible for the deficiency.

APPENDIX A

State of Delaware Division of Facilities Management

OFFICE SPACE STANDARDS

Position	Pay Grades	Space Category	Space Standard Sq. Ft.	Standard Modular Dimensions
Cabinet Secretary Agency Head Commissioner		A	235	14 x 17
Upper Management	21-25	B	175	12 x 15
Middle Management	16-20	C	125	9 x 14
Professionals/ Managers	11-15	D	100	9 x 12
Admin. Support	6-10	E	75	8 x 9
Secretary/Clerical	1-5	F	50	8 x 8

NOTE: These standards define employee workspace only. Allowance for additional space for circulation, conference and reception areas, storage, restrooms, etc. must be given.

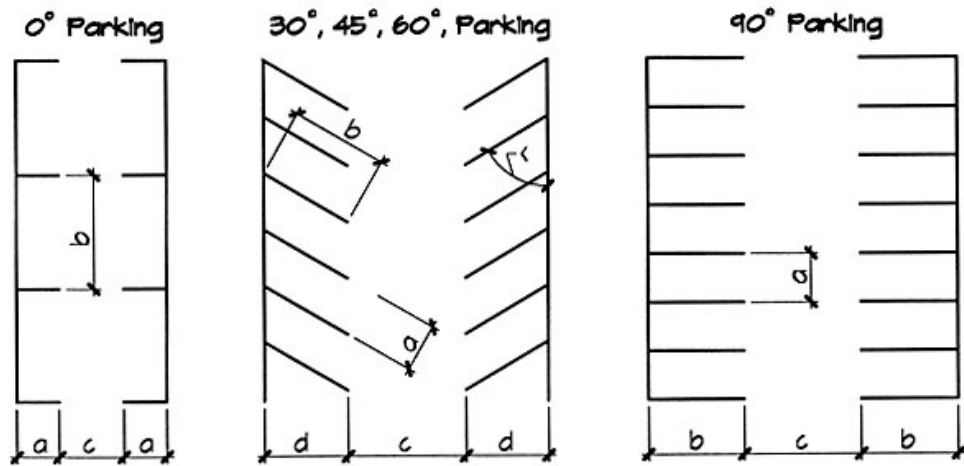
APPENDIX B

OFF-STREET PARKING STANDARDS

1. Number of spaces: To be determined by the local jurisdiction.
2. Surfacing and drainage: Permanently paved with asphalt, concrete or other all-weather surface approved by DFM. The surfaces shall be drained to eliminate standing water and prevent damage to adjoining property and/or public streets.
3. Striping: All spaces shall be striped or delineated with bumper blocks where paint striping is not feasible.
4. Arrangement: Parking areas shall be arranged to provide orderly and safe loading, unloading, parking and storage of vehicles. Aisleways, parking spaces, accessible parking areas, fire lanes, etc. shall be clearly marked.
5. Curbs: A continuous 6 inch high concrete curb shall be installed around the parking lot to:
 - a) Prevent vehicles from going beyond parking lot.
 - b) Serve as an edging for plantings and islands.
 - c) Protect buildings and other structures.
 - d) Delineate entrances and exits.
 - e) Separate vehicular ways from pedestrian ways.
6. Lighting: Provide for parking areas used at night. Lighting shall not have adverse impacts on surrounding properties nor interfere with the safe operation of nearby vehicles.
7. Pedestrian ways: Provide for safe pedestrian access to all parking spaces.
8. Entrances: To be designed and approved in accordance with DelDOT standards.
9. Loading facilities: To be in accordance with the local jurisdiction.
10. Landscaping: Provide landscaping to enhance the appearance of the parking area, to provide shade, to minimize noise, to reduce stormwater runoff and to screen views from public roads. A landscape plan will be approved by DFM.
11. Dimensional standards: Parking spaces and aisleways shall be designed in accordance with the following drawings and charts. Note that 90° parking (perpendicular to aisle) is encouraged whenever possible.

Minimum Dimensions for Required Parking Spaces

Dimension Indicator	0° (Parallel)	30°	45°	60°	90° (Perpendicular)
a	8'	9'	9'	9'	9'
b	21'	18'	18'	18'	18'
c (one way)	12'	14'	16'	18'	22'
c (two way)	22'	22'	22'	22'	22'
d	--	17'	19'	20'	--



12. Stall width reduction: Stall width may be reduced to 8.5 feet in office parking lots for the use of employees. However, parking spaces available for the general public shall not be reduced. Parking spaces shall clearly be identified as such. This requirement is subject to approval by DFM.
13. Accessible parking spaces: Number and dimensions to be per requirements of the Architectural Accessibility Board.

APPENDIX C

DFM PROTOTYPE OFFICE BUILDING

1. Space Planning

- a) The building interior shall be centered around a central core that contains the restrooms, elevators, stairs, janitor, electrical and telephone rooms.
- b) The offices shall be along the exterior wall and the interior wall. This leaves an open area for modular workstations. The following are the components of the interior space plan. Coordinate structural bay sizes and layouts with office sizes and layouts.

Refer to Appendix A, OFFICE SPACE STANDARDS

2. Building Core

- a) Toilet Rooms
 - 1) Countertops and backsplashes shall be solid polymer surfaces.
 - 2) Provide a shut-off valve for the supply water for each toilet room in the plumbing chase.
 - 3) Provide high-back urinal units with large bowls.
 - 4) Provide wall-hung water closets.
 - 5) Provide lever handles for toilet and urinal flush. Consider the use of infrared auto-flushing devices in major toilet areas with heavy volume usage.
 - 6) Toilet and urinal plumbing shall be located in an accessible plumbing chase. Provide floor drains with trap primers in all plumbing chases.
 - 7) Toilet partitions shall be floor supported. Partitions shall be solid plastic polymer.
 - 8) Toilet partitions shall have a maximum clearance between the floor and partition of 12 inches.
 - 9) Attach toilet partitions to adequate structural support including backing in walls in accordance with the manufacturer's performance requirements.
 - 10) Toilet room walls may be masonry or water-resistant gypsum board with acoustical insulation.
 - 11) Floor surface shall be sloped to floor drains so no ponding occurs. Ensure that the location and slopes do not conflict with accessibility requirements.
 - 12) Tile Considerations. Floors shall be unglazed ceramic or non-slip porcelain floor tile. Separate color schemes may be developed for the men's and women's toilet rooms on a floor-by-floor basis. Base shall be coved tile. Walls behind the water closets and urinals shall be ceramic or porcelain tile. All other walls shall be a multi-colored paint system. Coordinate all grout joints in the wall, base and floor tiles so that they are aligned. Dark grout is preferred. Thresholds shall be marble, maximum height of 1/2 inches with 1:2 sloped beveled edges. Tile wainscots are preferred.
 - 13) Ceilings shall be water-resistant gypsum board painted with semi-gloss latex paint. Ceiling height to be 8 feet AFF but may be increased slightly to match tile coursing.

- 14) Doors shall be solid core wood doors, painted or stained, 3 feet by 7 feet minimum. Frames shall be painted hollow metal.
 - 15) All toilet accessories shall be stainless steel. Recessed type units shall be used wherever practical. Typical toilet stall accessories shall be through-partition type.
- b) Janitor Closets
- 1) Floors shall be stained/sealed concrete. Base shall be coved vinyl/rubber. Wall finish shall be epoxy paint on water-resistant gypsum board or CMU.
 - 2) Provide a floor sink and a floor drain with the floor sloped to the drain.
 - 3) Ceilings shall be water-resistant gypsum board painted with semi-gloss enamel or exposed to structure above.
 - 4) Provide a stainless steel mop rack and shelf.
 - 5) Doors shall be solid core wood, painted or stained, 3 feet by 7 feet minimum. Frames shall be painted hollow metal.
 - 6) Size janitor closet to provide supplies storage space. Consult with DFM Project Manager to determine size.
- c) Electrical and Communications Rooms
- 1) Provide separate electrical and communication rooms.
 - 2) Walls shall be painted CMU or gypsum wallboard.
 - 3) Ceilings shall be the exposed structure.
 - 4) Floors shall be hardened and stained/sealed concrete.
 - 5) Doors shall be solid core wood, painted or stained, 3 feet by 7 feet. Frames shall be painted hollow metal.
 - 6) Size electrical rooms to allow adequate ventilation and servicing room around the equipment.
 - 7) Shall not be located next to elevator shafts, stairwells, pipe chases or other obstructions that would prevent conduits from entering the rooms from all sides.
 - 8) Meet code clearance requirement but in no case provide less than 4 feet minimum clearance around electrical cabinets.
- d) Communications Rooms
- 1) Consult with the DFM Project Manager for telecommunications design criteria for the communications room and the overall system.
 - 2) These rooms shall not provide access to any other space or room.
 - 3) Communications rooms shall be equipped with receptacles, surge suppression and grounding as required by the communications program.
 - 4) Communications rooms shall have the walls where equipment is to be mounted covered with 4 feet by 8 feet by 3/4 inch interior-grade plywood.
 - 5) Communications rooms shall not be used to house building controls, security equipment or other such uses unless expressly approved by the Project Manager.
- e) Mechanical Rooms
- 1) Floors shall be hardened and stained/sealed concrete sloped to floor drain(s).
 - 2) Ceiling is exposed structure.
 - 3) Walls are painted concrete masonry or water-resistant gypsum board.

- 4) Mechanical equipment rooms shall be located on exterior walls with exterior doors where possible.
 - 5) Exposed piping shall be painted and color coded.
 - 6) Provide adequate ventilation.
 - 7) Provide acoustic separation of mechanical rooms from adjacent office spaces.
 - 8) Interior doors shall be solid core wood, painted or stained, 3 feet by 7 feet or larger as may be dictated by service requirements of equipment. Exterior doors shall be painted hollow metal, sized for equipment width and height. Frames shall be painted hollow metal.
 - 9) Overhead coiling-type doors should be provided for removal and replacement of large equipment items such as boilers, air handlers, chillers and water tanks.
 - 10) Servicing requirements require an adequate clearance with a minimum clearance of 2 feet 6 inches from any wall around mechanical equipment. At air handlers, provide clearance for removal and replacement of filters, fan shafts and coils.
- f) Stairs
- 1) Walls shall be fire rated as required by code and shall be CMU or gypsum shaft wall, painted with high traffic/washable latex type wall paint multi-color system with a maximum of two colors.
 - 2) Treads, risers and landings shall be steel with concrete filled pans. The floors, stairs (tread and risers) and all landings will be carpet, vinyl or rubber.
 - 3) The ceilings shall be 2 feet by 2 feet suspended acoustical ceiling tile.
 - 4) Doors shall be fire rated as required, painted hollow metal, 3 feet by 7 feet minimum. Frames shall be hollow metal, painted and fire rated as required by code.
 - 5) Light fixtures on landings shall be located 7 feet minimum above landing.
 - 6) All light fixtures are to be accessible with a 6 foot ladder.
 - 7) In order to encourage use of stairs in lieu of elevator, provide at least one stair in multi-story buildings, which is conveniently located with main pedestrian traffic flows, i.e. adjacent to lobby. Provide sufficient width, 5 feet minimum, so two adults can pass each other comfortably while traveling in opposite directions.
 - 8) Guard railings shall be designed with vertical pickets or in-fill panels. Straight horizontal elements, which provide a ladder for children, are not acceptable.
 - 9) Provide vision panels in all stair doors.
- g) Corridors
- 1) Walls shall be painted, fire-rated gypsum board painted with an eggshell high traffic/washable latex type wall paint.
 - 2) Floors shall have standard glue down carpet with a minimum 10-year warranty. The carpet shall be a tufted textured graphics loop with a pile face weight of 26 ounces per square yard. Base shall be vinyl/rubber, coved, 4 inches high.
 - 3) Ceiling shall be 2 inches by 2 inches suspended acoustical ceiling tile.

- 4) Indirect lighting may be used.
3. **Main Lobby**
 - a) Floors
 - 1) Floor finish and base shall be slip-resistant hard tile (ceramic, quarry or stone), thinset.
 - 2) Dark grout is preferred.
 - 3) Coordinate location of construction joints in concrete floors with location of tile joints.
 - 4) A metal edge strip shall be placed at termination of tile where tile abuts carpet.
 - b) Walls shall be gypsum board with appropriate fire rating.
 - c) Ceiling finish shall be acoustic ceiling panel, painted gypsum board, or metal.
 - d) Building entry doors for the general public and staff shall not be automatic unless approved by the DFM Project Manager. Use vestibules or revolving doors to control drafts. Building emergency exits shall be used as exits only and shall not be used for normal access.
 - e) Directory will be provided. Coordinate location and installation requirements with the DFM Project Manager.
 - f) Reception or security stations are not needed in the lobby unless so indicated in the program.
 - g) Card readers shall be provided at all principal entries.
4. **Tenant Spaces**
 - a) General
 - 1) Walls shall be painted gypsum board and terminate 6 inches above the ceiling except that walls of offices for Division Directors, Assistant Division Directors and larger rooms are to extend to the underside of the deck above. Conference rooms, training rooms and those spaces requiring confidentiality should also extend to deck above. Walls are not to be acoustically insulated except as required by the program and approved by the DFM Project Manager.
 - 2) Ceilings shall be flat lay-in 2 inch by 2 inch acoustic panels generally 9 feet 0 inches high.
 - 3) Doors shall be solid core wood, painted or stained, 3 feet by 7 feet minimum.
 - 4) Frames are painted hollow metal. Knock down frames are permitted.
 - b) Conference Rooms
 - 1) Accessories such as tack boards, marker boards and projection screens are provided and located only as required by program.
 - c) Computer Room
 - 1) Floors shall be static-free resilient sheet vinyl or raised access flooring as required by program. Base shall be coved vinyl/rubber.
 - 2) Walls shall be painted gypsum board with acoustic insulation extending to the underside of the deck above and with acoustical sealant at the top and bottom of the wall. Walls shall be fire rated as required by code.
 - 3) Ceilings shall be 2 feet by 2 feet lay-in flat acoustic panels.
 - d) Files/Storage
 - 1) Floors may be resilient vinyl tile or carpet. Bases shall be coved vinyl/rubber.
 - e) Copy/Break/Vending Rooms

- 1) Floors shall be vinyl composition tile or ceramic/porcelain tile. Cove bases shall match flooring material.
- 2) Counters and backsplashes shall be plastic laminate. Sinks shall be stainless steel. Base and wall cabinets shall be plastic laminate or hardwood. Protect splash area behind coffee sinks.
- 3) Requirements for appliances including coffee makers, refrigerators and microwaves should be reviewed with the client and confirmed by DFM Project Manager.
- 4) Requirements for seating areas should be reviewed with the client and confirmed by DFM Project Manager.
- 5) Walls will be standard high traffic/washable latex type wall paint.
- 6) Ceilings shall be suspended 2 feet by 2 feet acoustical tile.
- 7) Point source exhaust ventilation to be provided.
- f) General Requirements
 - 1) Utilize the room numbering system provided by DFM Project Manager.
 - 2) Door numbers are to match room numbers.
 - 3) Provide fire extinguishers as required by code. Locate on construction documents.

5. Building Envelope. The building shall be designed to ensure weather tightness, minimize maintenance, maximize building longevity and be architecturally compatible with the environment.

- a) Roof System. Metal, standing seam roof systems are preferred; when used they shall have the following characteristics:
 - 1) Aluminum Material 0.032 inches for roof panels, trim and flashing unless indicated otherwise. 0.032 inches for soffit panels, pre-manufactured soffit. 0.080 inches for gutter and downspouts.
 - 2) Finish: Polyvinylidene fluoride, Kynar 500, Hylar 5000 resin-based coating.
 - 3) Performance: 110 mph wind load, ASTM E 1592 test compliance. Be tested by UL to meet or exceed Underwriters Laboratories class 90 wind uplift requirements. Meet or exceed ANSI A58.1.
 - 4) Underlayment: Continuous full rubberized self-adhering asphaltic membrane
 - 5) Roof Deck: Continuous structural metal deck.
 - 6) Warranty: Warranted for a period of 20 years against perforation or structural failure of metal roofing panels and accessories. Roofing panel manufacturer must warranty for minimum period of five years that the finish color will not change more than 5 NBS units in accordance with ASTM D 2244-78 and will not crack, peel or lose adhesion with the substrate for a period of 20 years. A minimum 20-year warranty by the manufacturer specifying that the metal panel system will be watertight. Warranty will state that if repairs are necessary guarantor will provide materials and labor to make repairs at no cost to owner. Specify that a single subcontractor is responsible for the entire roof system.
- b) Exterior Wall System. The exterior walls shall be brick veneer with structural steel stud backup, 2 inch air cavity, air/vapor barrier, 5/8 inch exterior gypsum sheathing, structural steel studs (6 inches) with R-19 fiber glass insulation without facing and 5/8 inch gypsum wall board.

- c) Exterior Glazing Systems. All exterior glazing shall be insulated double paned. The typical glazed opening shall be a center-glazed storefront system.

APPENDIX D
DFM FACILITY LISTING

NAME	BLDG. NO.	ADDRESS	SQ. FT.	EMP.	BUILT
Legislative Hall	01	411 Legislative Avenue, Dover, DE	86,000	200	1932 1970 1994
Jesse Cooper	02	417 Federal Street, Dover, DE	51,945	228	1960
Townsend Building	03	401 Federal Street, Dover, DE	99,270	340	1970
O'Neill Building	04	410 Federal Street, Dover, DE	16,555	45	1925
Capitol Police/Credit Union	05	150 East Avenue, Dover, DE	10,630	26	1942
W.A.R. Building	07	60 The Plaza, Dover, DE	3,650	12	1939
Tatnall Building	08	150 Wm. Penn Street, Dover, DE	22,925	32	1941
Fleet Management Bldg.	09	150 Wm. Penn Street, Dover, DE	180	8	1989
Sykes Building	10	45 The Green, Dover, DE	8,080	28	1812
Short Building	11	21 The Green, Dover, DE	8,400	25	1830
Biggs Museum	12	406 Federal Street, Dover, DE	23,564	4	1994
Public Archives	13	121 Duke of York Street, Dover, DE	78,500	49	1938 2000
Supreme Court	14	55 The Green, Dover, DE	12,820	6	1910
Old State House	15	59 The Green, Dover, DE	8,106	4	1792
Haslet Armory	16	122 Wm. Penn Street, Dover, DE	36,866	17	
Kirk Building	18	15 The Green, Dover, DE	5,375	12	1830
Public Safety Building	19	303 Public Safety Blvd., Dover, DE	43,866	155	1992
State Police Headquarters	20	1441 N. DuPont Hwy, Dover, DE	13,140	47	1956
State Bureau of Identification	21	1441 N. DuPont Hwy, Dover, DE	10,230	40	1970
State Police Academy	22	1441 N. DuPont Hwy, Dover, DE	17,350	6	1969
State Police Garage	23	1441 N. DuPont Hwy, Dover, DE	10,070	12	1958
State Police Hangar	24	1441 N. DuPont Hwy, Dover, DE	1,510	1	1973
State Communication Center	25	3036 Upper King Road, Camden, DE	4,800	12	1988
State Police Troop 3	27	3036 Upper King Road, Camden, DE	10,825	71	1974
State Police Lab	28	1441 N. DuPont Hwy, Dover, DE	3,000	5	1991
Troop #2	29	100 Lagrange Avenue, Bear, DE	53,300		2002
State Fire Marshal's Office	30	1761 Chestnut Grove Rd, Dover, DE	10,000	20	1989
State Fire School	31	1761 Chestnut Grove Rd, Dover, DE	30,580	17	1968
State Fire School Maint Bldg.	32	1761 Chestnut Grove Rd, Dover, DE	4,300	0	1987
Sussex Court of Chancery	33				
Bridgeville Visitor's Center	34	18799 Sussex Hwy, Bridgeville, DE	5,776		1994
Massey Station	40	516 W. Loockerman Street, Dover, DE	8,925	0	1860
J. P. Court 8	41	100 Monrovia Avenue, Smyrna, DE	1,800	3	1988
Kent County Family Court	42	400 Court Street, Dover, DE	35,000	86	1988
State Police Information Support Services	43	1441 N. DuPont Hwy, Dover, DE	1,500	6	
Kent County Emergency Service Facility	44	911 Public Safety Blvd., Dover, DE	16,480	30	1998
Highway Administration Building	50	800 Bay Road, Dover, DE	118,494	380	1971
Sign Shop	51	56 Sign Shop Lane, Dover, DE	24,655	52	1971
DAST Building	52	96 Sign Shop Lane, Dover, DE	17,850	38	1980
Dover Inspection Lane	53	415 Transportation Circle, Dover, DE	10,230	10	1969
Facilities Management Maintenance	54	192 Transit Lane, Dover, DE	6,570	36	1985
Facilities Management Grounds Storage Shed	55	192 Transit Lane, Dover, DE	2,340	0	1985
Agriculture Lab	57	2320 S. DuPont Hwy., Dover, DE	5,500	5	2002

NCC Fire Marshal's Office	58	MacArthur Drive, New Castle, DE	11,460		1999
DEMA Facility	59	165 Brick Store Landing, Smyrna, DE	28,700	50	1998
Elections Building	60	119 N. Race Street, Georgetown, DE	2,240	4	1950's
Sussex County Family Court	61	22 The Circle, Georgetown, DE	31,000	150	1988
Sabo Building	62	1 Race Street, Georgetown, DE	2,880	9	1960's
Sussex County Inspection Lane	63	P.O. Box 399, S. Bedford St. Extension, Georgetown, DE	11,350	25	1960
Sussex County Courthouse	64	10 The Circle, Georgetown, DE	50,500	100	1880
Sussex County Fire School	65	RD #3 Box 15A, Industrial Park Blvd., Georgetown, DE	3,000	1	1991
Sussex County Fire Marshal's Office	66	RD #3 Box 15, Industrial Park Blvd., Georgetown, DE	2,600	16	1991
J. P. Court 3 & 17	67	17 Shortly Road, Georgetown, DE	4,500	35	1989
J. P. Court 4 & 19	68	408 Stein Hwy, Seaford, DE	4,500	13	1990
J. P. Court 5 & 6	69	715 S. DuPont Hwy, Milford, DE	1,800	3	1989
Sussex County Courthouse Annex	70	10 The Circle, Georgetown, DE	11,700	0	1970
Woodburn	71	151 Kings Highway, Dover, DE	9,995	5	1790
Hall House	72	181 Kings Highway, Dover, DE	5,680	0	1880
Woodburn Garage	73	151 Kings Highway, Dover, DE	1,200	0	1920
Murphy House	74	417 S. State Street, Dover, DE	6,625	4	1845
Thomas Collins Building	75	540 South DuPont Hwy, Dover, DE	43,370	170	1982
J. P. Court 7 & 16	76	480 Bank Lane, Dover, DE	16,740	49	1998
Greater Wilmington Motor Vehicle Lanes	77	2230 Hessler Blvd, Wilmington, DE	33,800	60	1999
Williams Service Center	78	805 River Road, Dover, DE	42,695	180	1974
Agriculture Building	79	2320 S. DuPont Hwy, Dover, DE	32,140	85	1966
Public Health Day Care	80	449 N. DuPont Hwy, Dover, DE	2,740	5	1960
Rose Cottage	81	102 State Street, Dover, DE	3,380	11	1862
William Penn Building	82	801 Silver Lake Blvd, Dover, DE	49,900	155	1982
State Police Indoor Pistol Range	83	391 Clark Farm Road, Smyrna, DE	28,285	2	1997
NCC Courthouse	84	5 th & King Streets, Wilmington, DE	570,000	700	2002
State Library	85	43 S. DuPont Hwy, Dover, DE	16,856	22	1982
Richardson & Robbins Building	86	89 Kings Highway, Dover, DE	148,550	310	1882 1983
Delaware Economic Development Office	87	99 Kings Highway, Dover, DE	17,850	50	1881 1983
J. P. Court 10 & 12	88	210 Greenbank Rd., Wilmington, DE	6,300	22	1989
NCC Fire Training Center	89	2311 MacArthur Drive, New Castle, DE	4,500	3	1997
Amoco Building	90	715 Grantham Lane, New Castle, DE	19,075	130	1960
Carvel State Office Building	92	820 N. French Street, Wilmington, DE	302,250	920	1977 1998
Purchasing Building	94	1 Wilmington Ave., Gov. Bacon Health Ctr., Delaware City, DE	15,800	30	1981
Purchasing Warehouse	95	1 Wilmington Ave., Gov. Bacon Health Ctr., Delaware City, DE	20,000	2	1989
NCC Family Court	96	900 King Street, Wilmington, DE	71,700	250	1981
NCC Inspection Lane	97	161 Airport Road, New Castle, DE	29,035	50	1965
State Fire School Burn House	RN31	1761 Chestnut Grove Rd, Dover, DE	3,072	0	1965
State Fire School Central Tower	RN32	1761 Chestnut Grove Rd, Dover, DE	528	0	1965
State Fire School Metal Garage	RN33	1761 Chestnut Grove Rd, Dover, DE	2,880	0	1972

State Fire School Jump Tower	RN34	1761 Chestnut Grove Rd, Dover, DE	5,120	0	1965
State Fire School Smokehouse	RN35	1761 Chestnut Grove Rd, Dover, DE	2,080	0	1965
Facilities Management Maintenance Storage Shed	RN55	192 Transit Lane, Dover, DE	1,664	0	1991
Agriculture Building Annex	RN79	2320 S. DuPont Hwy, Dover, DE	3,127	6	1966
Agriculture Building Metal Garage	RN80	2320 S. DuPont Hwy, Dover, DE	2,310	0	1987
Purchasing Warehouse	RN95	1 Wilmington Ave., Gov. Bacon Health Ctr., Delaware City, DE	3,500	6	1930's
Purchasing Warehouse	RN96	1 Wilmington Ave., Gov. Bacon Health Ctr., Delaware City, DE	2,250	0	1930's